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INDEX TO CONTENTS, PAGE 99. . . . . ADVERTISERS' INDEX, PAGE 22.

Riter-Conley Manufacturing Company

STEEL CONSTRUCTION

Pittsburgh

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SMITHSONIAN DEPOSIT

THE UNITED GAS IMPROVEMENT COMPANY,

PHILADELPHIA.

BUILDERS OF

THE STANDARD DOUBLE SUPERHEATER

LOWE WATER GAS APPARATUS.

ACCURATE MEASUREMENT

OF

AIR AND STEAM SUPPLY

(PATENTED),

AFFORDING { **PERFECT CONTROL OF GENERATOR FIRE CONDITIONS.**

PRODUCING { **UNIFORM RESULTS. HIGHEST EFFICIENCIES.**

THE AMERICAN
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CONTENTS.

An Asterisk (*) Denotes an Illustrated Article.

*Details of a Residence-Lighting Campaign, Conducted by the Public Service Gas Company, of New Jersey, by "H.". 99

Proceedings, Sixth Annual Meeting, American Gas Institute—Continued from Page 94..... 101

First Day, Afternoon Session—Part I.- Further Comment by Mr. McIlravy—*Plants for Sulphate of Ammonia, by Mr. C. G. Atwater.

OFFICIAL NOTICES—

Forty-second Meeting, New England Association, Gas Engineers. 106

Annual Meeting, Illinois Gas Association..... 103

EDITORIALS—

Briefly Told..... 106

Co-operation in Association Work—February Meeting, New York Section Illuminating Engineering Society Current Mention.

Publications..... 107

Proceedings, Fourth Annual Meeting, Indiana Gas Association—Continued from Page 95..... 109

First Day, Morning Session—Mr. O O. Thwing's Response to Gov. Marshall's Welcome—Secretary-Treasurer's Reports—Appointment of Special Committee—President Mulholland's Inaugural Address—Committee on President's Address.

MANAGEMENT AND COMMERCIAL METHODS..... 112

*The Simplex Gas Forge.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 112

Mr. A. M. Sutherland Gets the Albany (Ga.) Contract—Contract for the Gas Machinery Company—Two Personals—Annual Meeting, Easton, Pa.—Death of Mr. James M. Nelson—Something from York County, Me.—Cheaper Gas for Denver, Col.—Big Power House for One of the N. Y. Consolidated Company's Subsidiaries—Annual Meeting, Rathbone-Sard Co.—Two Personals—Annual Meeting, Los Angeles, Cal.—Payment on Royalty Account, Evansville, Ind.—Manager Redding is Right on the Job An Interesting Decision -New Rate Schedule, Saginore City, Mich.—Proposed Plant for Wilson, N. C,—The Eugen Ordinance, Minneapolis, Minn.—And Other Items.

Recent Patent Issues..... 113

The Market for Gas Securities..... 114

Meeting Times of the Various Gas Associations..... 114

Public Lighting Table for February, 1912 (Advertising Section)... 27

Details of a Residence-Lighting Campaign, Conducted by the Public Service Gas Company, of New Jersey.

[Prepared for the JOURNAL by "H."]

The matter of improving consumers' residence lighting service is a subject which has been given considerable attention by our Company, and serious effort has been made by us to give an adequate service, as well as the best possible. Thousands-upon-thousands of dollars have been spent in enlarging mains, renewing services and improving pressure conditions. Reasonable rules have been in effect governing the piping of houses, and we dare say that thousands of cases of trapped users, and defects in house piping in consumers' premises, have been changed through our instrumentality.

In addition, we have always sold a good, reliable grade of gas fixtures and accessories. Then, too, we have supplied Bray burners free of charge to our consumers, whenever the occasion demanded new burners. We have sold Welsbach mantles and lamps (exclusively for years) at a reasonable price, and have thus made it easy for our consumers to get them from us through a reasonable system of credit, if so desired. In addition, we have sold only the best of lighting appliances, and have expended considerable money in advertising the fact that good lighting appliances were the only ones the consumer could afford to buy, whether sold by us or by others.

Our representatives have had constantly kept before them the important fact that, although we wished to sell ranges, water heaters and other appliances, they must also look after our lighting business and sell lighting appliances. That they have looked after the sale of lighttng appliances is evidenced by our sales of these appliances which, in 1911, were: 21,689 lamps, 82,489 mantles, 3,469 house piping orders, aggregating 13,893 outlets and 32,689 fixtures. These figures show a substantial increase over 1910. We do no house piping in new houses, and in many offices we do not sell fixtures for new houses. Since these sales are the result of the efforts of our representatives we, therefore, know that they are giving considerable of their time to our residence lighting business.

We have tried to meet the competition of the cheaper, inferior, incandescent lamps: and, in a measure, have been partially successful in doing so; but with hundreds of peddlers and stores selling lamps and mantles for the profit in such sales, it is no easy matter to get a good share of the business, because lamps, mantles and glassware look enough alike to the consumer to make it hard for even those with discerning ability to see how there could be such a difference in cost. But the Gas Company must find some way to displace these inferior lamps, as its service is, to a very great extent, judged by the service the consumer obtains through the use of these inferior lighting appliances. Such is the situation we have had to face, and one that most all gas companies will have to meet now or in the near future, if they are to receive the right return from their lighting business.

In looking around for a medium to meet the competition, and to displace the inferior lamps now in use, we decided to use the No. 647 lamp, made by the Welsbach Company. This lamp, of itself, had sufficient good points to recommend it. We have probably used in the neighborhood of 100,000 reflex lamps, and know that they have given very satisfactory service. We, therefore, knew that the No. 647 light, being an improvement over the reflex, was the very lamp we wanted.

It was equipped with the squat globe—to all intents and purposes a new light—and we decided to offer it to our consumers as such. To campaign the original reflex light was out of the question, because the price at which we had previously sold this lamp, equipped with by-pass, was only $1.75. This selling price would not permit the spending of the amount of money necessary to carry through a campaign of sufficient magnitude.

With the new lamp the situation was different. Inasmuch as it was a new and improved lamp, costing us more money to buy, we naturally had to sell it for more money than the old Reflex; in other words, we could ask our customers a price based on the selling cost of a campaign such as we wished to make. Then, too, we were to be the exclusive selling agents for this light in our territory, and we think our orders for 59,278 lamps justified our asking for the right to sell the No. 647 light exclusively, which privilege was granted us and lived up to by the Welsbach Company. Of this number we sold, to date of November 18th, 1911, 53,284 lamps. The following is a brief outline of the plan of our campaign:

We are selling, as previously stated, the No. 647 light (which we have renamed "The Welsbach, Economical Home Light) for $2.25, allowing the consumer to make three consecutive monthly payments of 75 cents. Each month the amount due will be noted on the regular gas bill or prepayment slip. We have also guaranteed the lamp against breakage for a period of 3 months from date of sale. The campaign was started, September 14th, by giving all of the men instruction on the construction of the lamp, how to install it, troubles likely to be met with and how to overcome them. The plan of sale of the lamps will be explained in detail to the new men, the contract and order form being gone over thoroughly. The selling points connected with the lamp, the inducements offered to the consumer and

the benefits the consumer would derive were dealt on. The possible objections consumers might advance were also discussed, and the answers to these objections brought out.

The men were told the extent to which the campaign had been and would be placed before the public through advertising, window displays and office announcements. The extra men are paid $1 a day salary, and 25 cents commission for every lamp sold by them. We held back the commission of the new men for 4 days, to enable us to check their work. This tends to make them more careful of the character of sales they make. The new men are required to sign an application for a bond. This has in a large measure protected us from unscrupulous agents. The supervisors are paid their regular salary, plus a bonus of 2½ points for each lamp sold and installed by the men under their supervision. This is really allowing the supervisors a bonus of 2½ cents per lamp. They also receive a bonus of 2½ cents on sales made by the regular representatives not actively engaged in the campaign; provided, however, that the lamps sold by the regular representatives are put on by the new men after 5 o'clock.

Credit is allowed new salesmen for office sales and a commission of 20 cents allowed the new salesmen, and a bonus of 2½ cents to the supervisors for these sales. Where credit is given the new salesmen for offices sales they are required to put on the lamps sold by the office after 5 o'clock. Lamps sold by the office, prior to September 18th, the date the new men begin their actual selling work on the street, were not credited to the new salesmen or the supervisors. These lamps were put on by the supervisors in order to give them the benefit of the experience in installing the lamps.

We have deemed it most desirable to keep all of the salesmen, whether regular or new, interested and enthused in the campaign; also, to do away with any friction that might arise through the medium of sales made which the regular or new men might claim were due to their efforts We are, therefore, paying a bonus of 5 points to the regular representatives, a commission of 20 cents to the new men and a bonus of 2½ cents to the supervisors on all sales made by the regular representatives who are not actively engaged in the campaign; providing, however, that the new men put on the lights thus sold after 5 o'clock.

In explaining the above it is necessary to state that our regular representatives have not been taken off their own work, except to act as supervisors. In smaller offices, where it was difficult to get the right kind of new salesmen, we found it necessary to use some of our regular men to actively sell the lights. In these offices we have given our regulars new men to help them, making the regular men responsible for the sales and installations of the new men.

In situations of this kind we have compensated the regular representatives by giving them the same bonus as the regular supervisors are paid; viz., 2½ points on all lamps sold by the extra men under their supervision, and also paid them their regular bonus of 5 points for the lights they personally sell.

In large offices we work the men in crews of 8 to 12; each crew is in charge of our own representative, who actively directs and supervises the work of his crew. He goes out with them in the morning, not later than 8:30, and remains with them all day, returning to the office at 5 o'clock. In small offices our crews number from 2 to 5 men. The supervisors are held responsible for the work of their men. They examine all contracts taken, to see that they are filled out properly, and, in-so-far as possible, inspect the installations made by their crew. We also have special inspectors in larger districts to inspect installations and take care of complaints and maintenance.

In order to receive complaints promptly we leave a post card with the consumer. It is printed in black, on blue stock. This card acts as a further check on our extra salesmen. It can also be used if the consumer wishes to order more lamps. We have an additional attractive post card which the salesmen leave in places where they do not close a sale. This card is printed in black, on yellow stock.

The men are restricted to one mantle a day breakage, for all over which number they are charged. We don't, of course, give them a mantle a day; as a matter of fact, some men have put on as high as 100 lamps without any breakage.

The men are allowed car fare daily; and, if sent out to put on lamps at night, are allowed additional car fare.

All lamps that are ordered returned by consumers for any reason are brought in by the supervisors, who endeavor to keep the lamps in if possible, and if they have to take them back handle them carefully. So far as our returns have been very little, as the supervisors have kept many lamps in that might otherwise have been removed.

One piece of advertising we issued was a post card sticker, one of which was placed on all regular bills and prepayment slips leaving offices during September. These post card stickers have been one of the best advertising mediums we have ever used. In some of our surburban territories we received orders on post card stickers returned by mail that totalled 10 per cent. of our estimates of sales. Although these stickers are only printed on 100-pound woodcut, they had carried through the mails in good shape.

PRIVATE MAILING CARD

PLACE STAMP HERE

Date_____

Public Service Gas Company

Dear Sirs:

Kindly send me

_____

of your

"Welsbach Economical Home Lights"

Name_____

Address_____

Public Service Gas Company

CITY

Front.

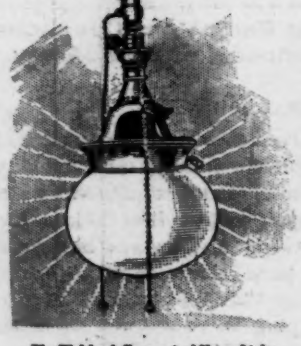
Weigh well this Comparison!

The Quantity And Quality OF LIGHT YOU GET

DEPEND UPON

The Burner

YOU USE.



The Welsbach Economical Home Light

You Should Have The Best Burner You Can Get.

HERE IT IS.

To Introduce It Quickly We Make You This Special Offer:

We will put one or more of these "Welsbach Economical Home Lights" in your home and you can pay us 75 cents a month for three months with your gas bill and you will have paid $2.25 the price of the light.

In addition we guarantee the light against breakage for three months.

We could not afford to do this if the light was not all we claim it is, neither would we recommend it to you.

ORDER ONE TODAY. WRITE NAME AND ADDRESS ON BACK OF THIS STICKER AND MAIL TO US.

This "Welsbach Economical Home Light" is sold exclusively by

PUBLIC SERVICE GAS COMPANY

Back.

There was some question whether we would be allowed to use these post card stickers, because they were so light in weight and did not conform to the regular post card size, but we asked for a ruling from the Postmaster General, at Washington, who ruled that they could be sent through the mails the same as post cards, providing necessary postage was paid.

We are also using a leaflet with a post card attachment. This leaflet is placed in the consumer's hands a day or so ahead of the sales-

mens' call. It explains our campaign in detail to the consumer. This is a very attractive leaflet printed in two colors, black and red; stock 80 pound, white coated. This leaflet has also brought us many orders through the mail.

We have advertised our campaign in the newspapers quite generously, carrying on an average of two "ads." per week. Our window displays have consisted of a scale as shown on post card sticker. This has been made out of wood and piped so that it can be lighted. We have also made use of a divided-booth arrangement, showing open flame burner in one section and "Welsbach Economical Home Light" in another. In the booths are placed signs calling attention to the comparison of light and cost.

We have also made use of two glass meters, as part of our exhibit, placing 3 open flame lights on 1 meter and 1 "Welsbach Economical Home Light" on the other. On cards we note the consumption and candle power of each.

We prepared a series of 7 attractive cards, each of which calls attention to some particular feature of the lamp or our plan of sale. These have been printed in 2 colors, red and black, on buff stock. These have been hung in our offices.

We use a special contract, which is arranged in triplicate—3 colors; one as a combined signed contract and order for our office records; one contract and order, to be left with consumer, and one as a storeroom record.

Ono of the surprises of the campaign was the ease with which the greater number of our new men have mastered the proposition, both from a selling and installation standpoint. We might say here that we do not allow them to do anything except take off the old burner and put on the "Welsbach Economical Home Light." If when they take off the old burner, the supply of gas is, in their judgment, not sufficient the supervisor is immediately called in; in fact he passes on everything out of the ordinary which he has been purposely assigned to do.

The men's sales have been from 25 to 2 per day. The men who are unable to average 6 lamps per day after a week's time are allowed to resign. Men who show little or no sales' ability are let go at once. Many men have averaged from 8 to 10 per day; some as high as 12. Some of our best salesmen are men who have not had previous selling experience in any line.

Now, as to troubles and complaints. We have had the usual troubles incident to a campaign of this magnitude, conducted as it has been over a great part of a great State, and all sorts of conditions to contend with, but, generally speaking, the campaign has run along smoothly, thanks to the splendid co-operation of all interested. We did not go into this campaign with the one idea of selling lamps alone. Our main purpose was to improve the lighting service of our consumers, and we believe in this respect that we have been successful. We also know that if we have done this we have made many friends for our service and the goods we sell, which goodwill is worth more than we can now estimate. Many appliances will be sold next year. Some have been this year, all directly traceable to the additional information we have learned of our consumers' needs. Through the medium of a campaign of this nature admittance is readily obtained to homes previously not easy to enter.

Then, too, a campaign such as this develops everyone engaged in it, shows us the possibilities of the business, and proves to all that many things are possible which look almost too difficult to attempt. Measured from the standpoint of dollars and cents, considered if you please as a hard, cold, business proposition, there is no reason why a campaign of this nature should not be self-sustaining and result in a profit to the company conducting it. Our campaign has paid all of its own expenses thus far, and from present indications it will be a profitable one for the manufacturer, the consumer, the men engaged in the campaign and the Company.

[CONTINUED FROM PAGE 94.]

PROCEEDINGS, SIXTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

HELD IN ST. LOUIS, MO., OCTOBER 18 TO 20, 1911.

FIRST DAY—AFTERNOON SESSION.—PART I.

Mr. McIlravy by way of bringing out some other points connected with the ammonia industry, made the following remarks respecting matters contained in his paper:[1]

Some seven or eight years ago the by product industry saw reason to be concerned as to the disposal of the ammonia that was coming on our market in large quantities. The producers of ammonia got together, discussed the situation and decided that the best way to cope with this condition was by working in unison through some one company and selected the American Coal Products Company, whom I represent, to act for them. It was my particular lot, first, to go through the country to find out why the fertilizers people were not using more sulphate of ammonia. In the Agricultural Experiment Stations of each State we found they were not recommending the use of sulphate of ammonia as a fertilizer, but rather the use of nitrate of soda. We then asked the gas men to go to the Experiment Stations of their States and use their influence to bring about the recommendation of sulphate of ammonia, where it was produced in the State, on the ground of its being a home industry. At first we did not get very much encouragement in these attempts. However, with the money that some of the companies gave for this purpose we went to work and made experiments in different parts of the United States on different soils. We studied the different types of soils to ascertain to what extent they would respond to sulphate of ammonia, and what quantity was the best to use. Among other things we found that, in the Middle-West, the soil is so rich that there is very little need for sulphate of ammonia; a good deal of by-product ammonia is made in the Middle-Western district and much is going to be made there. In the South we made experiments on cotton and found that sulphate of ammonia gave fine results. It did not leach through the ground like nitrate of soda, and the corresponding quantity gave as good or better results. Another question (that of tariff) came up about 2 years ago. There was a duty on sulphate of ammonia of 30 cents per 100 pounds, and this duty it was proposed to remove, placing the article on the free list. I called upon the gas men to stand shoulder-to-shoulder and help to keep on this moderate rate of protection; but the influence of the farmer was too strong and it was taken off. This brought sulphate of ammonia down to a price of about $2.50 per 100 pounds. About two years before I had made a trip abroad at the suggestion of the larger manufacturers, and found that in Germany they were making demonstration experiments with sulphate of ammonia on a large scale. In fact, they had as many as 20 or 30 trained men who devoted their whole time to such work and many more who devoted a part of their time to it. In Germany, where 3 or 4 years ago they were exporting about half of what they made, they are now using all the home production, and the gentleman who is in charge of the syndicate over there stated to me, when I saw him last spring, that they would have to buy 40,000 tons in addition to what they made themselves, although their output this year is over 370,000 tons. In England like conditions existed as those found by us first in this country; they were not using what they produced. The largest producers got together and formed a sulphate of ammonia committee, through which contributions of so much per ton of sulphate were levied, and which formed an organization for carrying on propaganda all over the United Kingdom. In this way they are endeavoring to bring up the consumption from 60,000 or 80,000 tons to something nearer the 375,000 tons that they annually produce. If they will only use up what they make we can take care of ourselves. The imports swamp us. In the cotton belt, which is easily reached from the seaports, we cannot compete with the sulphate imported from England, and we cannot compete when we have to ship from the Middle-West to the East. To maintain the market it is necessary to create a demand in the Middle-West itself. We have started to do that and we have met with very good results. In order to accomplish what we have set out to do, every gas man, large or small, will have to put his shoulder to the wheel and help push for sulphate of ammonia. He should not be afraid to spend a little time in propaganda work. It is unquestionably necessary, and, furthermore, if we come around and ask for a donation to help out the work, he should not turn up his nose at the request, because what we have already done has brought the price of sulphate of ammonia up from $2.50 per 100 pounds to $3 per 100 pounds. If you create the demand for sulphate of ammonia, you know the price will take care of itself.

The President then introduced Mr. C. G. Atwater who read the following paper on

PLANTS FOR SULPHATE OF AMMONIA.

It is the object of this paper to describe briefly the types of apparatus used in making sulphate of ammonia, in so far as information concerning them is at hand. It should be stated beforehand that part of the illustrations and part of the text of this paper have been used by the writer, in an article on the same subject in "The Mineral Industry" for 1907, and later revised, with the addition of descriptions of the "direct" processes for the "American Fertilizer Handbook," in 1910.

The manufacture of sulphate of ammonia on a moderately large

1. For the text of the paper, see JOURNAL, *ante*, p. 94.

scale in this country may be said to have begun in 1893, with the erection of by-product coke oven plants. Previous to this it was made at various coal gas works and elsewhere, but the plants were necessarily of small capacity, as the supply of ammonia was limited to the works output. These conditions have, in a great measure, been changed. A number of by-product coke oven plants have been built, many of which are successfully converting their ammonia into sulphate.

As in other lines of manufacture, we may expect to find the most economical production in the plants that operate on a large scale. This is particularly true of a product like sulphate of ammonia, the making of which involves a certain amount of manual labor which may be cheapened or eliminated in large installations. It is partly for this reason that the present output of sulphate in this country comes almost entirely from by-product ovens. These plants are by far the largest individual producers of ammonia, and, therefore, afford the opportunity for the making of sulphate in quantity. The usual recovery of sulphate from coal is about 1 per cent. of the weight of the coal carbonized, so that, for the production of 5 tons of sulphate per day, 500 tons of coal must be carbonized. There are but few coal gas plants of this daily capacity in the United States, but, on the other hand, most of the by-product oven plants exceed it. In England coal gas works of such capacity are more frequent, and those of smaller size are comparatively closer together, so that opportunity has been afforded for the establishment of ammonium sulphate plants that manufacture on a large scale, in some cases drawing their supply of liquor from several sources.

Both England and Germany, being larger producers of sulphate of ammonia, have led us in the design of apparatus for the purpose, therefore, much that follows is from the practice of these countries. Germany, in particular, has developed what is known as the "direct" method of producing sulphate from coke oven gas, which process seems likely to reduce the cost of plant and of operation.

The original method of making sulphate of ammonia was by running sulphuric acid directly into the crude ammonia liquor, and evaporating until the salt crystallized out. This method wasted all the "fixed" ammonia and produced an impure and dirty salt. Happily it has passed out of use in this country, the only relic of its existence being the archaic style of expressing the strength of ammonia liquor in ounces of sulphuric acid, in place of the actual per cent. of NH_3.

Chemistry of the Process.—The chemistry of ammonium sulphate has been frequently and adequately described elsewhere,[1] so that it will suffice to give only an outline here. In the methods hitherto employed the coal gas or coke oven gas has been washed with water, and the ammonia thus obtained in aqueous solution of from 0.5 per cent. to 2 per cent. strength has been treated by distillation. In the newer "direct" process, the ammonia in the gas is combined directly with sulphuric acid to form the sulphate. Leaving the discussion of the later method for the present, we will treat first of the older and still generally followed process. The crude liquor from the ammonia washers, as described above, is the raw material of the sulphate of ammonia plant. Chemically speaking, it is a complex compound, containing ammonia in various forms. Those that part with their ammonia on boiling, as the carbonate and sulphide, are known as "free" ammonia, while those that do not decompose at this tem perature, as the chloride, sulphate, sulphite, thiosulphate and ferrocyanide, are known as "fixed" ammonia.

The crude liquor is passed through a still, encountering a current of live steam, and is thus deprived of its free ammonia. The liquor containing the fixed ammonia is then mixed with a certain proportion of milk of lime (or other alkali), the effect being to free the fixed ammonia, which is then driven off by steam distillation, as before. The reactions that render the fixed ammonia free may be typified by that for ammonium chloride, which follows:

$$Ca(OH)_2 + 2(NH_4)Cl = CaCl_2 + 2H_2O + 2NH_3.$$

The gaseous ammonia, mixed with steam and the volatile impurities, as carbonic acid, hydrogen sulphide and tarry vapors, passes from the still to the condenser or separator, where a certain amount of water is removed, and is then led to the saturator. Here it is brought into intimate contact with dilute sulphuric acid, and chemical combination ensues which may be expressed by the following equation:

$$2NH_3 + H_2SO_4 = (NH_4)_2SO_4.$$

1. See Lunge, "Coal Tar and Ammonia;" "Cammille Vincent," "Ammonia and Its Compounds;" R. Arnold, "Ammonia and Ammonia Compounds;" F. Schniewind, "The Mineral Industry," Vol. X., p. 149.

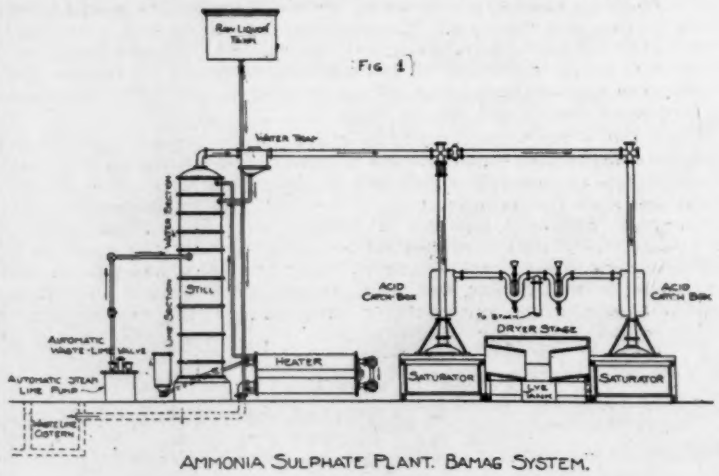
This reaction is attended with considerable heat. The sulphate of ammonia forms as small crystals and settles to the bottom, and the incondensable gases are usually conducted to a smokestack in operation, if one is at hand, or disposed of in some other manner. In the most modern plants the waste gases are chemically treated and rendered innocuous before being allowed to escape into the air.

Nature of Plant Required.—The essential parts of the apparatus are, therefore, a still, in which the ammonia is driven off, and a saturator, in which it is combined with acid. The still consists of the section for free ammonia distillation, the intermediate liming vessel, and the section for the distillation of the fixed ammonia set free by the action of the lime. This part of the apparatus is almost invariably made of cast iron. The stills are usually built up of separate sections fastened one above another, and provided with a system of partitions, connecting passages and sealing hoods, so that the ammonia liquor, entering at the top of the column and flowing gradually downward, is exposed to the action of the steam which enters below and passes upward, bubbling through the successive seals. This is the general plan, subject to many individual variations in design.

Accessories to the still are the pumps and tanks for crude liquor supply, the apparatus for slacking, measuring and injecting the lime, and the necessary steam piping, water piping, sewer connection for spent liquor from the still, etc. Frequently provision is made for a condenser which strengthens the ammonia leaving the still by removing some of the water vapor, and for a heater which permits the preheating of the crude feed liquor by the heat from the outgoing spent liquor or the waste gases. In some cases the concentration of the ammonia leaving the still is effected (in whole or in part) by the cold feed liquor.

The saturator consists of a tank or vessel of wood or iron, lined and protected with sheet lead to prevent corrosion by the acid. The ammonia vapor is led beneath the surface of the acid in the saturator by a dip pipe or bell, also lead protected, usually so arranged as to compel all the vapors to bubble through the acid, and allowing all those that are not absorbed to be carried away by a special connection, so that they shall not escape into the air. Accessory to the saturator are the tanks and pumps for supplying and handling acid and mother liquor and the appliances for removing the sulphate from the saturator, draining it, drying it and handling it to storage. Provision is also made for the supply of steam necessary to run the still and pumps, and, where conveying with other machinery is adopted, power is also needed. In the following descriptions of various plants the simpler ones will be taken up first, and those of more complicated character next in order.

Bamag System.—Fig. 1 shows the "Bamag" system (Berlin-An-



AMMONIA SULPHATE PLANT. BAMAG SYSTEM.

haltische Maschinenbau-Actien-Gesellschaft) built in the United States by Bartlett-Hayward Company. This plant consists of an ammonia still, with an overhead, wrought iron, crude liquor feed tank, with wooden float and scale, automatic steam lime pump with agitator tank, automatic waste liquor valve, water trap, crude liquor heater, two saturators with lead covered wooden acid boxes, lead bells and lead covered acid catch boxes, lead covered wooden drying stage and mother liquor tank, as shown. There are also an all-iron hand pump, a steel storage tank for acid, an air compressor for lime agitation and a centrifugal dryer for sulphate, not shown in the drawing.

The crude liquor passes by gravity to the heater, where it is heated

by the waste liquor from the still, the hot feed liquor passing then to the upper part of the still. where the volatile ammonia is driven off. The lime is pumped into the intermediate section of the still, and is thoroughly mixed with the liquor as it passes downward through the lime sections. The waste liquor leaves the still by the automatic waste valve. This waste, it is stated, should not contain more than 5 parts of ammonia in 100,000.

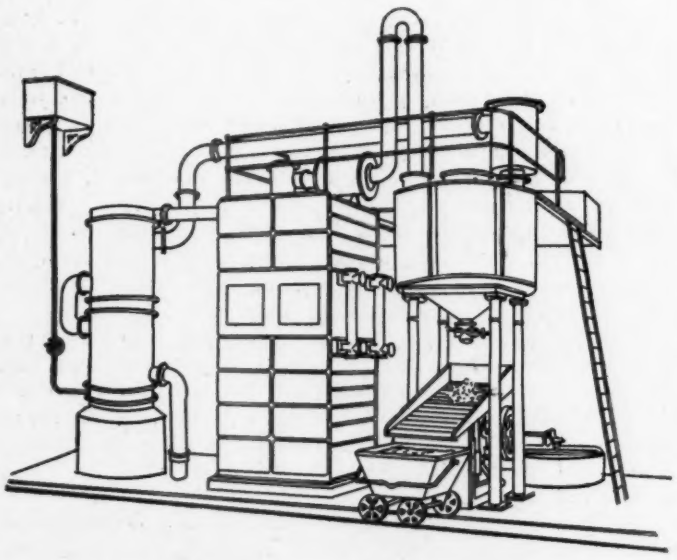
A water trap or separator, placed close to the still, serves to remove the condensed water from the ammonia gases, the condensate draining back to the still. The ammonia gases then enter the saturator through the lead bell. The unabsorbed gases pass from the bell to the acid catchbox, where the liquor acid is retained the waste gases being sent to the stack.

The formation of sulphate in the saturator is greatest under the lead bell, whence it must be removed by a wooden rake, and dipped out by hand with a copper ladle when the acid is nearly neutralized. The sulphate thus removed is then drained on the drying stage and the drainings run into the mother liquor tank. The sulphate may be then handled to the centrifugal dryer, thence to storage.

In this type of plant the still is operated continuously and the saturators alternately, one being saturated while the other is having the sulphate dipped out and the acid bath prepared for another run. Its operation also involves handling the sulphate by manual labor from the saturator to the drain board, thence by wheelbarrow to the centrifugal dryer, and again from the dryer to the storage bin.

Walker Plant.—An arrangement eliminating some of the manual labor is shown in the following plant, which is by C. & W. Walker, London, England, Fig. 2. The still is of the square type, the free

Fig. 2.



WALKER'S SULPHATE OF AMMONIA PLANT
WITH SQUARE STILL AND SELF-DISCHARGING SATURATOR.

still being the upper sections, the liming chamber the intermediate section, and the fixed still the lower sections of the column. The crude liquor flows from an overhead supply tank through the tubes of a vertical tubular heater and absorbs heat from the waste gases coming from the saturator. The tubes of the heater are provided with expansion joints at either end. The lime is mixed with water in a mixing tank, provided with mechanical agitators driven from the steam pump, which also injects the lime milk into the still.

In the lower section of the still (also in the liming chamber) are perforated steam coils, supplied with steam throngh a reducing valve which maintains the desired amount of pressure. The lower coil serves for the steam admission to the still, while that in the liming chamber is primarily to agitate the lime and cause it to mix properly with the liquor. Special emphasis is laid on the ease with which the still can be cleaned, and upon the freedom from stoppages from light tar carried in with the liquor, by virtue of the size and arrangement of the overflow connections possible in a square still.

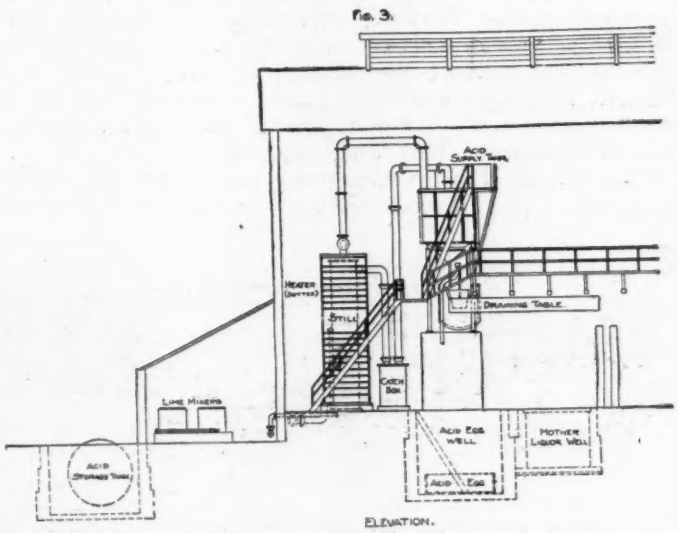
The ammoniacal gases escaping from the still pass through a baffle-box, where the condensed water is removed, thence through an inverted U-pipe to the saturator, which is of special type. It is cylindrical in form, has a flat top and a conical bottom, the whole being supported on columns above a drainage board. The shell of the saturator is of cast iron, and it is lined throughout with lead. The sides are of segmental plates, between the flanges of which the lead sheets are inserted and firmly held, the lead being afterward burned together to insure a thoroughly tight joint. The same description of joint is used in the bottom and top. The ammonia inlet and the waste gas outlet connections, made to the top of the saturator, are of the usual form. In the center of the top is a clean-out opening of large enough diameter to permit a man to enter the saturator to make repairs, and from this opening depends a lead curtain pipe which dips into the acid in the saturator, thus allowing access at any time. The discharge of the saturator, which is facilitated by the conical form of the bottom, takes place through a Howell patent discharge valve, made of specially prepared copper. This valve consists of a casing in which is mounted a plunger capable of backward and forward motion by means of a lever. The movement of the plunger serves to clear the passages of any incrustation or deposited sulphate.

The discharged sulphate and mother liquor are received on the drainage board and the liquor is drained off to a cistern, while the sulphate when sufficiently dry may be handled to a centrifugal dryer. Or, it is stated, the saturator may be placed directly over the centrifugal dryer, if desired.

In addition to the saving of labor in handling the sulphate which this form of saturator makes possible, an additional advantage is claimed for the durability of the lead lining, which is not bruised or abraded by the action of the dipping ladles. The waste liquor from a still of this type should, it is stated, contain less than 0.006 per cent. NH_3, and this, with the consumption of 8 cwt. of good coal per ton of sulphate produced from crude liquor of 5.25° Twaddell.

Darby Plant.—Figs. 3 and 4 show, in plan and elevation, a sulphate of ammonia plant typical of those erected by John H. Darby, Brymbo, Wales, in connection with by-product coke oven plants. This design shows a step further in the direction of saving labor,

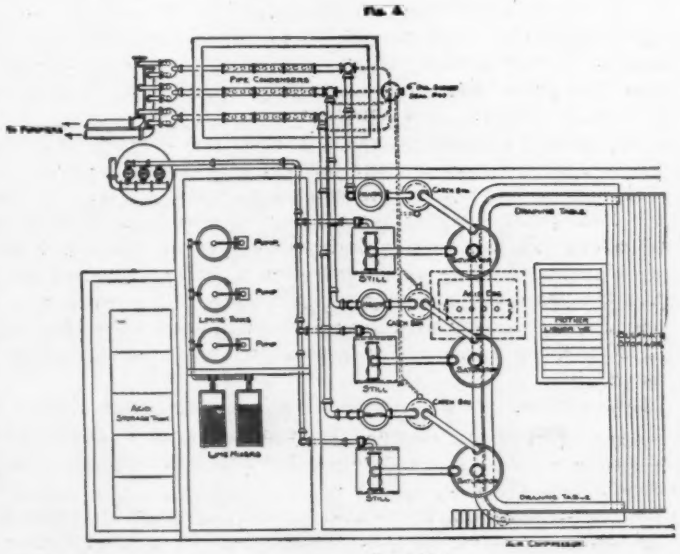
Fig. 3.



ELEVATION.

SULPHATE OF AMMONIA PLANT BY JOHN H. DARBY.

Fig. 4.



GROUND PLAN.

SULPHATE OF AMMONIA PLANT BY JOHN H. DARBY.

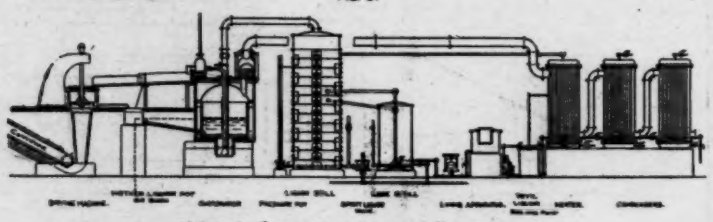
in that the sulphate from several stills is handled mechanically from the saturators to storage without any hand labor whatever. The plant shown is said to be capable of dealing with 250 to 270 tons of coke oven liquor per 24 hours,[1] and is erected in 3 independent units, any of which may be laid off without interfering with the others. Each unit consists of a still, a heater and a saturator.

The liquor is fed by gravity through the heater, where it is preheated to about 80° C. by the waste gases from the saturator. The still is square in section and of the combined free and fixed type, with a liming chamber about the middle of the column. Each compartment has four hoods, which are accessible by removing the side plates. The overflows from one compartment of the still to another are particularly liable to block up, and to avoid having to expose the whole compartment of the still by removing the side plate, the overflows are made exterior to the still and may be cleaned by removing a small cover plate. The limey effluent liquor from the still is sealed in seal pots of sufficient depth to maintain a pressure of about 5 to 8 pounds per square inch in the stills, and then flows to settling tanks to clarify and cool.

The ammonia vapor is delivered to saturators of the self-discharging type, elevated sufficiently to discharge the salt into buckets running on trolleys around the salt store. A continuous table catches the drainage from the buckets and delivers it to the mother liquor tanks, whence it flows into the mother liquor well below the floor. The same well collects the drainage from the sulphate store. The mother liquor flows by gravity from the well into an egg, and is blown by compressed air into an overhead tank for feeding the saturators. The fresh acid is blown by compressed air from the large acid storage tank outside the house to the elevated acid and mother liquor mixing tank, where the bath is prepared before flushing it into the saturators. The foul gases from the saturators pass through the catch pots where some of the watery vapor is intercepted, and thence through coolers (where the ingoing liquor is heated) to condensers. The uncondensed gases (chiefly sulphureted hydrogen) are passed through a Claus kiln to recover the sulphur, and finally through oxide purifier beds of the heaped up type as a safeguard.

Wilton Plant.—The general arrangement of the plant is shown in Fig. 5. The liquor is fed into preheaters and from there to the stills,

FIG. 5.



WILTON'S SULPHATE OF AMMONIA PLANT.

which it enters at a temperature over 187° F., at which point all volatile ammonia is freed. These preheaters are tubular, made entirely of cast iron, with specially constructed joints where the tubes fit into the tube sheets, to insure against leaks caused by expansion or contraction. The preheating is done by the exhaust gases from the saturator, these gases being almost entirely condensed by the time they leave the last heater. The condensation or "devil liquor" is frequently tested for ammonia, and if it shows any appreciable amount it is saved and put back through the still with the gas liquor.

The construction of the still sections is shown in Fig. 6 in detail, the salient point being its accessibility for cleaning. Each section has but one bubbling weir, which can be lifted up and pulled out of the side door, leaving the whole section clear to be steamed or scraped, without the necessity of taking the still down section by section, as is necessary with most designs. The overflows are easily reached through smaller hand holes in the sides, as also shown in the cut.

The saturator, like that shown in the Walker plant already described, is completely inclosed. The connection for inlet and outlet gas is made at the top, a manhole also being provided there for access in making repairs.

The most interesting feature of this still, however, is the method adopted for removing the salt. This is done by a steam ejector or syphon. The bottom of the saturator is perfectly flat, except for a small well in the center, in which the ejector stands. The ammonia vapor enters the saturator by 2 pipes, which come vertically through

1. Equivalent to 10 to 16 tons of sulphate with liquor of 1.24 to 1.5 per cent. NH_3.

Fig. 6.—Wilton's Ammoniacal Liquor Still. Bubbling Weir.

the top and enter the center of 2 crescent-shaped, perforated pipes which surround the well. The perforations are arranged so that the vapor shoots downward and towards the well, blowing all the salt to the well, at the same time thoroughly mixing and saturating the acid bath. The mother liquor comes in from the mother liquor pot and falls to the bottom of the saturator just back of the perforated pipes. This mother liquor pot is shown on top of the brick pier to the left of the saturator, and communicates with the latter by an inclined pipe.

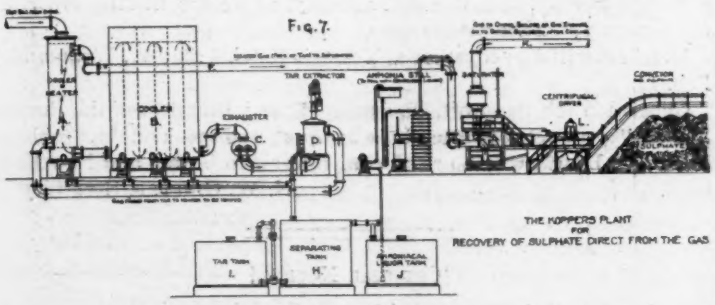
The operation of the saturator is the same as for any other type of continuous saturator. The bath is kept at about 32°-33° B. by a constant stream of acid flowing in, and the ejector may be kept going constantly throwing out salt, or the salt may be allowed to fill the well and up to the spray pipes and the ejector may be used intermittantly. A bell and vent pipe are provided toward the discharge end of the ejector pipe to carry off the steam so that it does not escape in the house. After being ejected onto the drainboard, the salt is handled in the usual way through a centrifugal dryer. The liquor from the drainboard and dryer runs directly into the mother liquor pot and from there into the saturator. The liquor level in the saturator is shown by the corresponding level in the liquor pot, or bosh as it is sometimes called, on the other side.

The advantage gained by the use of the ejector to handle the salt to the drainage boxes is very great, as it eliminates all hand labor to this point. It is stated by the makers that one man can operate a plant producing 10 tons of dried sulphate per day. From the drainage board it is only necessary to rake the salt into the centrifugal, whence it is dumped into the conveyor below. This type of plant has met with much success.

The processes described so far have been of the type generally used, in which water is the liquid by which ammonia is absorbed from the coal gas. Two processes have appeared recently in which this step has been eliminated, in part or entirely, and the absorption accomplished by the sulphuric acid itself. Both of these processes are of German origin, and are, respectively, that of Heinrich Koppers and that put forward by Dr. C. Otto & Co.

It is hardly fair, however, to discuss these methods without some reference to the work of Brunk, who, in 1903, obtained directly crystallized sulphate by passing coke oven gas through sulphuric acid, using two saturators in series. This attempt failed because the gas contained tar, which contaminated the sulphate and complicated the operation in other ways. The success of the later attempts rests on the ability to entirely remove the tar first. This is accomplished in the Koppers plant by reducing the temperature of the gas sufficiently to remove the tar by a P. & A. scrubber, the gas being then reheated before going to the saturator. In the Otto plant the tar is removed while the gas is still hot, by the use of a jet of tar sprayed into the gas, the effect being to condense the tar mist into a liquid form that is easily drained off. Both methods are in regular operation at a number of plants, and both produce salt of an excellent quality.

Koppers Ammonia Recovery System.—Fig. 7 shows a diagrammatic representation of this system. The hot gas from the ovens enters the cooler, *B*, which is of the multitubular type, where the temperature is reduced to about 90° F. The gas is then drawn by an exhauster, *C*, by which it is delivered to the tar extractor, *D*. After having been freed from the tar the gas is passed through a reheater, *A*, where



THE KOPPERS PLANT FOR RECOVERY OF SULPHATE DIRECT FROM THE GAS

in passing between the tubes it becomes heated to about 160° F. The heated gas is then conducted through the main, *F*, to the acid saturator, *E*, in which the ammonia in the gas is extracted by direct contact with the acid, and is recovered in the form of sulphate. The saturator is of the totally inclosed type, and the salt is continuously removed therefrom by means of an air injector. The salt is delivered to a collecting table from whence it is run off, together with the accompanying mother liquor into a centrifugal dryer, *L*, in the usual way.

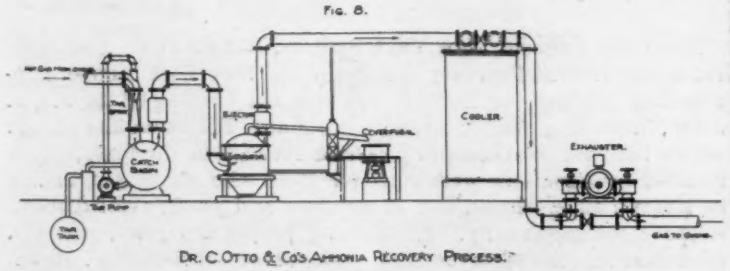
The gas passes out of the saturator and through an acid separator *H*, into the main *K*, by which it is conducted back to the ovens, or, if it is to be distributed to domestic consumers, it passes through the usual purifiers, meter and storage holder.

The products of condensation which are extracted in the cooling and tar eliminating operations are drawn off from the several apparatus, and are conveyed into a separating tank *H*, where the tar and ammoniacal liquor separate, according to their specific gravities. The tar flows into the storage tank *I*, the gas liquor goes into the storage tank *J*. The liquor is pumped to the ammonia still *G*, where the ammonia is driven off by means of steam and lime, in the usual way. The vapors of distillation are conducted from the still and are delivered into the main at the inlet of the cooler, where they mix with the gas and are finally absorbed in the saturator. Regarding the operation of this saturator, it is stated that the saturator liquor is maintained at from 3 to 5 per cent. of acid only, and as this is kept at a low temperature the organic constituents of the gas are not in the least affected. The gas on leaving the saturator contains no trace of acid and, therefore, there need be no fear of any corrosion taking place in the gas mains.

The usual temperature at which sulphate is produced in the ordinary open saturator is from 220° to 240° F., and as the salt obtained in this way is accompanied by free acid, trouble is experienced in shipping, owing to the action of the acid on the bags. The new system, it is claimed, renders it possible to produce a neutral salt at a temperature as low as 100° to 125° F., the chemical affinity between the NH_3 and the H_2SO_4 being so great within this range. Also, the regulation of the temperature of the acid bath may be made to govern the amount of condensation that takes place there. The salt is stated to be excellent in quality, white in color and without the slightest odor of tar. Its percentage of NH_3 is as high or higher than salt made in the ordinary way. Plants of this type are in operation at Gary, Ind.; Woodward, Ala.; and at Sault Ste. Marie, Mich.; as well as at a number of foreign plants. The process is being introduced into this country by Mr. Koppers, of Joliet, Ills.

Dr. C. Otto & Co.' Ammonia Recovery Process.—This method may be called the direct process. It is being introduced into this country by the United Coke and Gas Company, New York. It is in actual use at a number of English and German works. The accompanying illustration (Fig. 8) shows the general arrangement of the Otto plant.

Fig. 8.



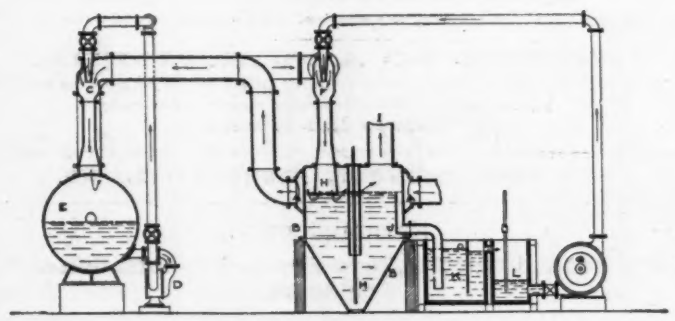
DR. C. OTTO & CO'S AMMONIA RECOVERY PROCESS.

The hot gas coming from the ovens encounters a tar spray, fed by the tar pump as indicated. A very intimate mixture of the tar and gas takes place, and the tar separates entirely from the gas in the catch basin immediately succeeding the tar spray. The tar produced runs off from the catch basin to the tar storage tank. After the tar separation the hot gas containing all the water and ammonia vapors is conducted to a closed saturator containing the sulphuric acid. Here the ammonia is precipitated in the form of sulphate and is lifted from the saturator to a draining table by an ejector, as indicated on the drawing. It then passes to the centrifugal dryer, thence to the storage bin. The mother liquor from the draining table and the centrifugal returns directly to the saturator. After the gas has passed the saturator it is cooled and freed from water in water coolers to fit it for subsequent use.

The gas is moved at first by the tar spray blowers as far as the saturators, and in the subsequent part of the plant by the exhausters, which draw the gas through the saturators and the coolers, and then deliver it to the benzol plant, thence to the coke ovens and other points of consumption.

The advantages of the direct method are evident. Both the equipment and the operation of a plant are considerably simplified. There are no ammonia washers, hence there is no water consumption for gas washing; there are no ammonia stills, hence there is no consumption of steam and lime, and no spent liquor and waste lime to take care of. These simplifications result in a considerable saving in the cost of operation. A modification of the original Otto apparatus is described in a recent patent. The illustration (Fig. 9) shows

Fig. 9.



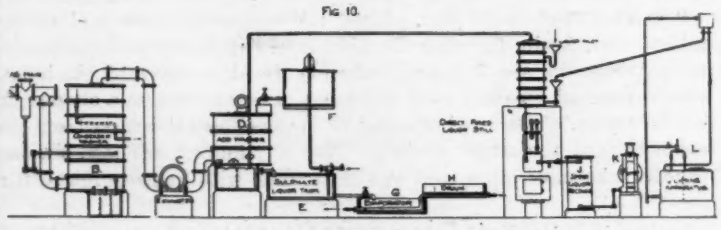
DR. C. OTTO & CO'S AMMONIA PLANT. ACCORDING TO A RECENT PATENT.

the arrangement of the tar spray and saturator in greater detail than in the previous drawing.

The crude, hot gas, which first of all circulates in an envelope, *A*, is used for reheating the saturator, *B*. By the injector, *C*, which a pump, *D*, feeds with hot tar, it is relieved of the tar, which is received in the collector, *E*. While in existing plants the gas is led by two distributing pipes into the bottom of the acid contained in a saturator of the same external form as in the diagram, the Otto system is to make the hot and tar-relieved gas pass through the injector, *F*, which is supplied with liquid acid by a pump, *G*. A more complete reaction would thus be assured than in the large saturation vessels provided with the ordinary means for increasing the contact of gas and liquor. To avoid the acid being carried off and to complete the washing, the end of the injector dips lightly into the saturating bath, H. After this last bubbling through, the gas leaves (at *I*) practically free from ammonia, and passes into a cooler in order to have its steam extracted. The mother liquor is run out by the overflow, *J*, into a separator, *K*, where the small amount of light tar which was able to float on the bath is retained. This mother liquor is continuously retaken by the pump *G* from the vat *L*. An ejector, *M*, lifts the salt deposited in the saturator *G*, into a dryer.

Wilton's Modified Sulphate of Ammonia Plant.—A modification of the Wilton plant already described has been put out, the particular feature being that it adapts the Koppers arrangement to the purposes of a small or moderate gas plant. The general arrangement is as shown in Fig. 10. The gas from the hydraulic main passes

Fig. 10.



WILTON'S MODIFIED SULPHATE OF AMMONIA PLANT.

(*Continued on page* 108.)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, FEBRUARY 12, 1912.

[Official Notice.]

Forty-second Meeting, New England Association of Gas Engineers.

New England Association of Gas Engineers,
Office of the Secretary,
East Boston, Mass., Feb. 9, 1912.

The Forty-second Annual Meeting of the New England Association of Gas Engineers will be held Wednesday and Thursday, February 14th and 15th, 1912, at Young's Hotel, Boston, Mass. The following papers have been prepared:

"Shavings Scrubbers," by Dr. J. F. Wing, Everett, Mass.

"The Office as a Publicity Medium," by Palmer York, Fitchburg, Mass.

"Recent Developments in the Manufacture of Water Gas," by Viggo E. Bird, Fall River, Mass.

"Industrial Appliances," by H. L. Barnes, Hartford, Conn.

"High Pressure Distribution," by C. G. Goeltz, Weymouth, Mass.

Question Box.

"What is the amount of condensation (in gallons) that is considered allowable per 1,000,000 cubic feet of gas pumped into high pressure distribution lines at 5 pounds, 10 pounds, 20 pounds pressure?"

"What would be considered the fair allowable loss, in feet per 1,000,000, or percentage of loss, on account of the condensed matter that is pumped or run off from the high pressure lines?" Answers edited by C. E. Page, Malden, Mass.

"The Pitot Tube: To what extent do gas companies use same to determine the actual flow of gas in mains?"

"Proper temperature of the carburetor and superheater for proper gasification of the enricher in water gas plants; and what experience members have had in using pyrometers to obtain this temperature."

"Riveted steel, main pipe, placed between condensers and rotary outlet; and, again, forming the main inlet line in the purifier house, having been in use 3 years, suddenly develop signs of pin holes, which, later on, grow to such an extent as to necessitate a change to cast iron pipe. The wasting away of the steel metal occurs from the inside toward the outer surface. Has any one experienced similar troubles with steel pipes, and was the cause with remedy found for same?"

Applications for membership should reach the Secretary by Tuesday, February 13th, in order to be acted on at the meeting. Members will please be prompt in attending the sessions at 10 A.M. and 2:30 P.M., Wednesday, and 10 A.M. Thursday, as we are usually crowded for time to finish the programme.

Members will dine together at Young's Hotel, 6:30 P.M., Wednesday, Feb. 14.

General Hugh Bancroft, Chairman of the "Directors of the Port of Boston," is expected to attend the banquet, and speak on the problems before his Board, which are of vital interest to Boston and New England.

N. W. Gifford, Secretary.

[Official Notice.]

Annual Meeting, Illinois Gas Association.

Illinois Gas Association,
Temporary Office of Secretary,
Dixon, Ills., January 17, 1912.

To the Members, Illinois Gas Association: The next annual meeting of the Illinois Gas Association will be held in the Auditorium Hotel, Chicago, under dates of March 20th and 21st, 1912. Announcements as to papers to be discussed will shortly appear in this Journal.

F. E. Newberry, Secretary.

BRIEFLY TOLD.

Co-operation in Association Work.—The inaugural address, by President Mulholland, at the last meeting of the Indiana Gas Association, the text of which appears elsewhere in our current number, gives expression to some thoughts on co-operation which are possible of extended and beneficial application. He suggests a bureau of information for the use of the members which could be extended to the newly formed Ohio Gas Association in the adjoining State. The idea is an excellent one, but its application should not be limited to one other association but rather to all of them. Of course, in this opinion we do not forget the fact that such co-operation should not in any sense be so operated as to curtail the field of those engaged in the field of expert or consulting work. Such men are entitled to the proceeds of their knowledge. However, we imagine that association expert work will never overlap the territory of the independent expert, and we sincerely hope that such time never will practically come out on the calendar. The organizers of the American Gas Institute contemplated a much greater interchange of work with the local gas associations than has been accomplished, and that the idea has not brought forth much of importance is no reflection on the originators, but rather upon those who were to have carried it out. This charge is made with the perfect assurance that we may not be successfully controverted, for it surely appears to be a certain fact that in this case, as in others, everyone's business is usually no one's business. The several committees of the Institute should be able to care for the needs of those desiring aid throughout the entire country, and that they have not is because they have not been asked to do so. The papers read at Institute conventions and the discussions on them should prove valuable topics for local association meetings. Many papers presented to local associations would be of much greater benefit to the industry at large were they first presented at the Institute convention. Without endangering local autonomy and the much cherished "home rule" in local affairs, the Secretaries of each, perhaps all, of the associations could merge themselves into a national committee on association work, with the end of putting forth a programme for a considerable period, which would be of great benefit to the industry.—Lumino.

February Meeting, New York Section, Illuminating Engineering Society.—The February meeting of the New York Section, Illuminating Engineering Society, was held the evening of the 8th, at 8 P.M., in the Engineering Society's Building. Following the custom which has been so successfully carried forward in the Philadelphia Section, arrangements were made for those who so pleased, to dine in Keene's Chop House, and 36 members and guests availed themselves of the opportunity. The meeting proper was given over to a somewhat lengthy paper entitled, "The Choice of Reflector: Its Influence upon Illumination Efficiency and Depression in Visual Function," by Messrs. Arthur J. Sweet and L. C. Doane. While it was read in the abstract it was explained *ad lib* by the former. The researches made to obtain the material used in the paper covered a period of nearly 6 months, and the conclusions, which had a partly

commercial tenor, did not seem to satisfy the audience in regard to exactness, due to the fact that the bases upon which the tests were made were in question, and that the statements as to the superiority of one type of reflector over all others for all purposes was rather too catholic. When Chairman Stickney called for discussion the usual hour for adjournment had been reached; but, nevertheless, there were many who desired to be heard, amongst whom were Messrs. E. L. Elliott, P. S. Millar, Dr. H. E. Ives, Norman Macbeth, R. F. Pierce, Dr. S. W. Ashe and several others. Over 80 members were in attendance, and as the meeting did not adjourn until midnight, there is no doubt that the authors succeeded in interesting, if not convincing, the audience. Owing to a recent change in the constitution three additional section managers were elected to serve until July 1, 1912. Those nominated and elected without opposition were Messrs. C. L. Law, E. H. Harman and T. S. Scofield.

CURRENT MENTION—

MR. F. W. HUMPHREYS, formerly in charge of the New Business division of the Poughkeepsie section of the trading of the Central Hudson Gas and Electric Company, of Newburgh, N. Y., has been appointed Manager of the Pontiac (Mich.) Light and Power Company.

THE Stamford (Conn.) Gas and Electric Company has put its capital stock at $1,000,000, and the distributing system will be extended to the settlements of Glenbrook and Springdale.

MESSRS. ELLIS and Miller are to be congratulated over the successful completion of the magnificent holder (6,000,000 cubic feet capacity) erected by the Bartlett-Hayward Company at the Sassafras Point Station of the Providence (R. I.) Gas Company.

ACTIVE measures are in hand, by certain influential residents of Hastings, Neb., to cause the taking over, by purchase, of the properties of the Hastings' Gas Company, for operation thereafter on municipal account.

THE factory plant of the National Brake and Electric Company, Larkin street and Belleview place, Milwaukee, Wis., is now beautifully illuminated through the use of 178 Humphrey gas arcs of the inverted type. Anti-vibraters freely used, do away with all objection to whatever shock might accompany the working of heavy machines. The workmen in the factory are especially well pleased over the installation, this being quite a frequent sentence during the early times of the new style of illuminating the shops: "I don't hit my fingers any more with my hammer." The cost for the service, too, is very low, the 178 arcs here noted being maintained at less than $2 per hour.

TO-DAY Chief W. H. Bradley (and "Chief" he surely is) of the engineering staff of the Consolidated Gas Company, leaves for Bradentown, Fla., in which charming spot he will pass the balance of this month and the whole of the month of March, when that ancient party, known to our forbears of long ago as "Boreas," holds sway. It is our more than pleasant part to note that the veteran goes away this year better off from a physical point of view than for a decade. Safe journeying and pleasant times to him, we, of course, all wish.

AT the annual meeting of the shareholders of the Washington (D. C.) Gas Light Company the Directors elected were: Jno. D. Mc Ilhenny (who succeeds his father, Mr. John McIlhenny), Joseph Daniel Fraser (who succeeds Mr. Jno. R. McLean), Howard S. Reeside, Guy F. Whiting, Ord Preston and James M. Green. The meeting was presided over by Mr. J. G. Rosengarten, of Philadelphia. Messrs. John R. McLean and Richard Goldsborough were thanked by the stockholders for their services. The annual reports showed that the output of the Company for the past year amounted to 2,294,946,629 cubic feet of gas, which was sold at an average price of 85.75 cents per 1,000 cubic feet. The total receipts amounted to $2,028,278, of which $97,645 came from sales of coke, tar, ammoniacal liquor, etc. The expenditures amounted to $1,533,268, and the credit to gain was just short of ½ million dollars. The Company has 1,251 shareholders, the paid-up capital amounted to $2,600,000, the bonded indebtedness amounted to $3,515,932, which included 50 year, 5 per cent., gold coupon bonds, valued at $3,452,152; improvement bonds, valued at $7,500, and accounts payable valued at $56,280. In the expenditure column oil (9,839,634 gallons) cost $302,080. Coal cost, $250,096; labor, on gas making account, $107,027. Transmission and distributing expenses are returned at $152,000; salaries and expenses of general officers, including administrative and law expenditures, totaled $88,827. Taxes absorbed $138,382, and interest was responsible for an expense of $179,296. Labor in all departments absorbed $364,515. The candle power of the gas furnished averaged 22.89, and the number of consumers' meters in use, December 31, 1911, was 56,042. The gain in sendout over that for 1910 amounted to 49,622,000 cubic feet, and the main system was increased by the placing of 31 miles of pipes. The dividends for the year amounted to $624,000, which payment seems to have exceeded the net earnings ($495,010) by $128,990.

BEAUMONT, TEX., is arranging a great white way illustrating that which can be accomplished by means of proper placing of gas arc lamps. The Civic Improvement Club is the instigator, although likely Mr. M. T. Walker had a word or two to say about the origination of the plan.

THE Central Gas Company, of Muncie, Ind., has filed a mortgage to secure a bond issue of $5,000,000 five per cent., 20-year gold bonds. Of this sum $1,200,000 has been issued, the remainder being reserved to be put out as occasion demands for betterments and extensions.

REPLYING to a protest filed by the E. F. Brooks Company, dealers in gas and electric fixtures, Washington, D. C., objecting to the proposed house-to-house inspection of gas fixtures by the Washington Gas Light Company, the Board of District Commissioners replied that the Commission was not in the least disposed to interfere with the inspection in any way.

THE Bucks County (Pa.) Public Service Company has submitted a protest against the granting of a charter to the proposed New Hope Gas Company. The argument will be had before the Governor, tomorrow.

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

Baltimore Advertising.—Two features of the advertising that is being done by the Gas and Electric Company, of Baltimore, Md., which, although often advocated by many enthusiasts, are seldom carried out in the same business like manner. These features are represented in the illustrated return post cards used by this Company so effectively. The cards are original in ideas and attractive in appearance, their number is almost legion, their appearance is *continuous*, and their application is *intensive*, as they are sent to "live" prospects. They are part of a comprehensive system, and Messrs. Cohn and Dodson surely deserve credit for the successful application. We believe we do not assert too much in saying that the Cohn-Dodson combination will forward samples of these "card feelers" to any who make request for same.

Street Lighting.—The University of Illinois, "Bulletin No. 51," consists of an extensive treatise on street lighting, by Messrs. J. M. Bryant and H. G. Hake, containing 61 pages, 6 by 9, with several illustrations. The authors have attempted to lay down the rules of good lighting, and have applied several types of electric lamps to fit the rules. Elaborate tables of operating costs are given, based upon the laboratory efficiencies of the lamps described. The tables show that, for residence districts, tungsten lamps produce better theoretical results than arc lamps, a fact which was demonstrated practically five years ago, which fact may be taken for just what it is worth. The figures comparing various type of arc lamps have not been borne out in practice, and the differences are such that they may cause surprise to many of our electrical contemporaries.

Annual (1911) *Report, Maryland Public Service Commission.*—The report, covering the work of the Public Service Commission, of Maryland, is the first of the various reports of this nature to come to hand. The corporations supervised have a total capitalization of $1,380,250,844, and the report carries many interesting figures respecting matters of both a fiscal and engineering nature. Out of over 24,000 gas meters tested, 24 were tested upon complaint, and only one of them proved fast beyond the legal limit of 2 per cent. A summary of gas tests and analyses of the gas supply of Baltimore contains the following figures:

Nature of Test.	Maximum.	Minimum.
Range in average candle power.....	22.56	21.09
Range in average heating value.....	722.9	656.6
Range in average sulphur.....	11.4	5.2

With reference to testing, the Commission states: "It has been brought to our notice that the Bureau of Standards, at Washington, is exerting itself to secure the co-operation of State Commissions and municipal authorities for comprehensive testing."

(*Continued from p. 105.*)

through a condenser and then to an exhauster, going direct to an acid washer or saturator. The exit gases from the saturator are led to the purifiers. The liquor condensed in cooling the gas is distilled in a small, direct-fired still, provided with suitable liming apparatus, pumps, etc., and the ammonia from the still returns to the saturator box to be absorbed by the acid along with that obtained from the gas. The sulphate appears to be drawn out of the saturator by gravity to a tank alongside the saturator, and the mother liquor is drained off, the excess being evaporated in an evaporating pan.

The Burkheiser Process.—This process is designed so as to recover ammonia as sulphite or as sulphate from coal gas. It employs the ordinary methods of cooling the gas and removing the tar, but then in place of scrubbing it for ammonia passes it through purifiers charged with a special oxide which removes the sulphureted hydrogen only. Thence the gas is led to a saturating box, where the ammonia is absorbed by an acid-water solution, prepared by washing the air with which a sulphur-fouled box has been regenerated. The ammonia, removed as liquor by the ordinary condensation process before the purifier, is passed through an ammonia still and the vapor is passed through the purifier with the gas. After the saturator above mentioned the exit gases are passed through a supplementary ammonia scrubber, where the last traces of ammonia are removed by washing with acid solution. The whole process operates in a continuous cycle or series of cycles, producing a finished, dry, salt and a clean gas. The advantages claimed are:

(1) Production of ammonia salts and purification in one complete and simple process.

(2) Avoids purchase of acid by using the sulphur in the coal.

(3) Cyanogen compounds are transformed into the more valuable ammonia, increasing the ammonia yield by 8-10 per cent.

(4) Reduction of cost of plant and room required in buildings.

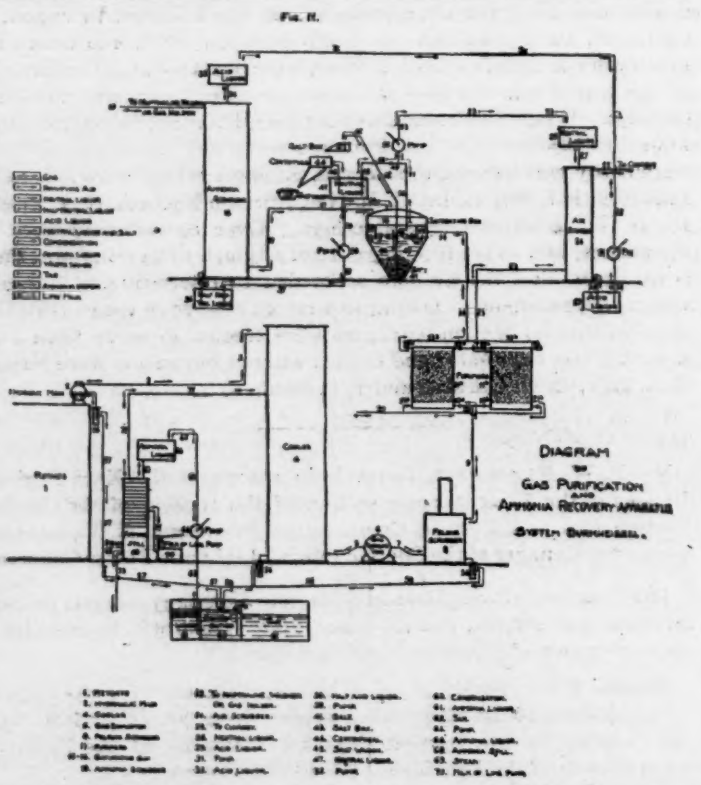
The oxide used in the purifiers is specially prepared, the preparation, as stated, consisting of heating ordinary bog ore of rather large size to a point sufficiently above 100° C. to remove part of the chemically combined water, the oxide turning, first, a yellow color, then a deep red when the proper degree of heating is obtained. The oxide so prepared is said to be extraordinarily efficient in removing H_2S so that a gas speed of 8 inches per second is admissible. Furthermore, a depth of 6 to 10 feet of the mass can be resorted to, because of the large grains and open character. This saves room in the purifying apparatus.

The regeneration of the oxide takes place in the purifier, there being two boxes receiving alternately gas and air. The ordinary regeneration to sulphur must be carried on so energetically as to form sulphurous acid. The heat so produced renders a special construction of the boxes necessary, and this heat is transferred to the adjoining box in which the gas is being purified. As it is stated, no condensation of moisture is allowable in the purifier, as it would lessen the activity of the oxide; hence the maintenance of a higher temperature in the gas than that desired in the coolers is advantageous. This is obtained by the transfer of heat from the adjoining purifier.

The following description of the operation refers to the diagram in Fig. 11. The process is supposed to be applicable to coke ovens, although a retort gas plant is here designated.

Description of the Burkheiser Process.—The gas comes from the retorts at 1, through the hydraulic main 2 and pipe 3, to the cooler, and is there cooled to the proper temperature for separating the tar, goes through the pipe 5, to the gas exhauster 6, through the pipe 7, into Pelouze scrubber 8, and is here entirely freed from tar. The condensation from the cooler 4 goes to 54, and from there through the pipes 58 and 59 to the pit 60, where the ammonia liquor and tar separate themselves in accordance with their specific gravities in the pits 61 and 62. The condensation from the Pelouze is also led to these 3 pits through the pipe 58 and 59. The ammonia liquor in 61, which contains also considerable of the sulphureted hydrogen and cyanogen important to this process, is raised by the pump 64, through the pipes 63-65, to the overheated tank 66, and from here passes through the pipe 67, to the ammonia still 68. Milk of lime is supplied by the lime pump 70, and the pipe 71, in order to free the fixed ammonia, and steam enters the still through the pipe 69. The vapors from the still are led through the pipe 72, directly into the cooler 4. The hot vapors from the still encounter the cooler gas in the cooling column and the condensation is drained away, an effect that is possibly aided by the rapid circulation due to the difference in temperatures.

By this arrangement all of the sulphureted hydrogen, cyanogen and ammonia are delivered to the Burkheiser apparatus proper, which



immediately follows the Pelouze. At first sight it would appear that the condensates would circulate continuously through the cooler and distilling column, and that their quantity would constantly increase. This, however, is far from being the case, as a certain equilibrium is soon arrived at, so that the evaporation of only 25 per cent. more water than that naturally condensed from the gas is necessary. The gas from the Pelouze, containing all the ammonia cyanogen and sulphureted hydrogen, passes through the pipe 9, past the closed valve 10 B, and through the open valve 10*A*-, into the Burkheiser purifying oxide. This removes all of the sulphureted hydrogen, also a large part of its cyanogen, and the valve 22-A, being closed, the gas leaves the purifier by the valve 12-A, and the pipes 13A and 14, reaches chamber 15 of the saturating box, here parts with the largest portion of its ammonia and leaves the chamber 16 by the pipe 17, passing to the ammonia scrubber 18. The gas leaves the scrubber entirely clean and ready for use. The pipe 19 is provided to connect with a naphthaline scrubber, if desired.

After a fixed period has elapsed, say 1, 2 or 3 times in 24 hours, the purifier in use becomes saturated with sulphureted hydrogen. The valve 1*A*- is closed and the valve 10-*B* opened, so that the gas is turned into purifier 11-*B*, and led through the valve 12-*B* to the pipe 13-*B*; from here the process goes on as before. The fouled purifier, the oxide in which is saturated with sulphureted hydrogen, now receives a carefully regulated current of air, by which the sulphur compounds removed from the gas are so strongly oxidized that they form sulphurous acid.

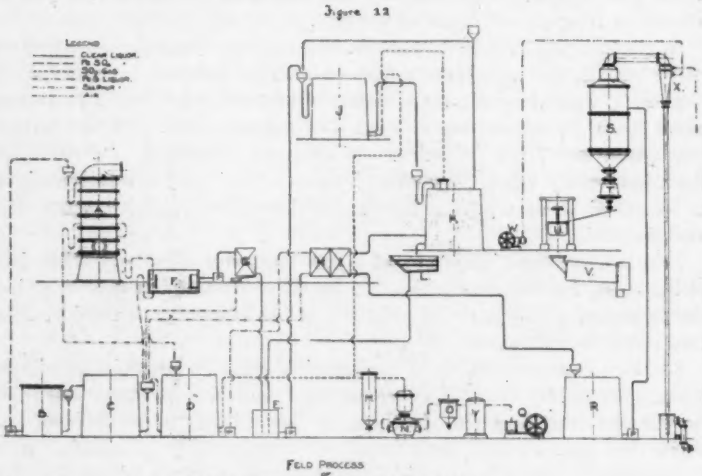
Assume that 11-*B* is the purifier that has up to now received the gas. The air current passes, by the pipe 20 and an open valve 21-*B*, into the purifier 11-*B*, the sulphurous acid there formed passes out of the open valve 22-B, the valve 12-*B* being closed, passes through the pipe 23 to the air scrubber 24, and there gives up all its sulphurous acid to the liquor introduced from the tank 26 by the pipe 27. The acid solution, drained to the tank 29, is lifted by the pump 31, through the pipe 32, to the overhead holder 33, flows from there through the pipe 34 to the ammonia scrubber, here absorbs the rest of the ammonia that remains in the gas and flows as half-neutral liquor through the pipe 35 to the collecting tank 36, passes through pipe 37 to the pump 38, and is delivered to pipe 39 to the saturating box, where it is entirely saturated with ammonia, becoming fully neutral. This neutral solution is drawn through the pipe 50 and an open valve 51, to the pump 52, from there by the pipe 53, to the tank 26, where through pipe 27 it again goes to the acid washer 24, to be once more saturated with sulphurous acid and to flow as acid solution through 28 to the tank 29. This acid solution has again a strong affinity for ammonia; therefore, it passes through pipe 32 and tank 33, once more to the ammonia scrubber 18 and there absorbs ammonia. As soon as the saturation point is reached the salt crystallizes out and deposits in the saturating box. This salt is lifted by the ejector 42, to the salt box

43, and from there to the centrifugal 44, where it is dried and comes in that condition to the salt wagon ready to ship. The mother liquor draining from 44 passes through the pipe 46 to the liquor washer 47, and is there placed in circulation again by the pump 52, which delivers it to the tank 26, to pass again through the acid washer, etc., as before.

As may be seen the absorption of the ammonia is accomplished to some extent by the ammonia scrubber 18, but principally by the saturating box. In this way the loss of ammonia remaining in the exit gas from the saturating box is avoided on the one hand and the formation of salt in the ammonia scrubber on the other. The salt formation takes place in the saturating box. It is claimed that the use of lead linings for the saturation apparatus is entirely unnecessary. The ammonia salt obtained is stated to be about 75 per cent. sulphate and 25 per cent. sulphite, and tests 25 to 25.5 per cent. NH_3. It is pure white in color and contains no free acid, always having a slightly alkaline reaction. The tests of the salt in agriculture are stated to have been favorable, but further advice is awaited on this point. The process has been placed in operation at several gas works in Germany.

The Feld Process.—Feld's process of sulphur and ammonia extraction from coal gas with the simultaneous manufacture of ammonium sulphate, as practised at the works of the Central Union Gas Company, New York, is illustrated in Fig. 12.

Figure 12



Feld Process of Sulphur and Ammonia Extraction from Coal Gas with the Simultaneous Manufacture of Ammonia Sulphate.

A solution of copperas is made in tanks *D*, *C* and *B*. As soon as his solution is prepared it is pumped by pump *P*, from tank *B*, into the top of the washer *A*. The copperas solution ($FeSO_4.7H_2O$) reacts with the hydrogen sulphide (H_2S) and ammonia (NH_3) in the gas, washing out the entire ammonia contents and its equivalent in sulphur. This washing process takes place in the chambers of the washer *A*, the overflow from which being divided, a portion flowing over into tank *D*, and the other portion, passing through the three lower sections of the washer, flows into the settling tank *F*. The iron sulphide mud from *F* is siphoned off and passes into neutralizer tank *C*, while the clear liquor, separated by gravity in *F*, is pumped by *P* into filter press *G*, the clear liquor from the latter flowing into overflow tank *E*. The liquor in tank *D*, having extracted the sulphur and ammonia, is now regenerated by the admission of sulphur dioxide coming from the sulphur stove *M*, the vessel *N*, interposed between the stove and the tank, being a sublimator for catching any free sulphur carried over in the gas. This regenerated liquor passes through the same process as above described until it reaches a stage where it contains in solution from 30 to 40 per cent. of ammonium sulphate.

When the liquor has reached this degree of saturation the clear liquor containing the $(NH_4)_2SO_4$ passes from tank *F* through press *G* into overflow tank *E* as above described, while the iron sulphide mud from *F* is used to neutralize the acid qualities of the regenerated liquor coming from *D*.

While the wash liquor continually passes through the above process, the clear liquor containing ammonium salts is pumped from tank *E* into the acid mixer *J*, where it is again treated with sulphur dioxide in order to prepare the salts for oxidation; after this treatment the liquor overflows into oxidation tank *K*, where it is treated with heat by means of a steam coil.

The heat in this tank decomposes the liquor into sulphate and sulphur, the sulphur being precipitated while the sulphate liquor is drawn off through filter-press *I*, into the storage tank *R*; the precipitated sulphur is raked out of tank *K* into a drain board L, the liquor from the latter passing back to tank *E*.

A certain amount of sulphur is precipitated out of the washing liquor in tank *D*, and the precipitation is daily pumped into filter-press *H*, the liquor from the latter flowing back into tank *C*, while the sulphur from presses *H* and *I*, as well as from drain board *L*, is burned into sulphur dioxide in sulphur stove *N*, the necessary air for combustion being supplied by the compressor *Q*, the air passing through the receiver *Y*, and dryer *O* before entering the stove.

After tank *R* has been filled with a concentrated solution, or from 30 to 40 per cent. strength of ammonium salts, the liquor is pumped into the vacuum boiler *S*, where the liquor is evaporated and sulphate of ammonia produced, the latter salts passing through the salt catcher *T* into the centrifugal *U*, where the greater part of the moisture is thrown off, this latter liquor passing from the centrifugal into storage tank *R*. The salts from the centrifugal are passed into the rotary dryer *V*, and upon leaving the latter are ready for bagging. The quantity of liquor boiled off daily in the vacuum boiler is replaced by water in the regeneration tank *D*.

The author wishes to acknowledge the assistance of Capt. W. E. McKay, of the New England Gas and Coke Company, Boston, in the revision of the text and the preparation of the illustrations. Thanks are also due to Messrs. F. E. Lucas, of Sydney, Nova Scotia, W. E. Hartman, Gas Engineer for H. Koppers, W. H. Blauvelt, of the Semet-Solvay Company, and F. H. Wagner, of Bartlett-Hayward Company, for assistance rendered in preparing this paper.

Mr. Atwater further said he had some hesitation in presenting the paper, because it was largely the compilation of the work of others. Also he did not see the name on the programme of the man who had the most to do toward getting up this symposium on ammonium sulphate, viz., Capt. W. E. McKay. He presumed the paper filled a certain place in the transactions as recording progress and making the transactions take on to a certain extent the character of a reference book, which he thought added to their value. Much progress had been made in the manufacture of sulphate of ammonia in the last few years, and they were probably familiar with the old way of making the sulphate of ammonia. Recently they had seen the process advance from the recovery by the use of water as a washing agent to the recovery by the use of sulphuric acid direct from the gas, and then had gone further to the newest processes in which other washing fluids were used, and the sulphur in the gas itself supplied the sulphuric acid for the manufacture of the sulphate of ammonia. That was a great advance, and it was highly appropriate that the Institute took note of it in its "Transactions."

(To be Continued.)

[Continued from Page 95.]

PROCEEDINGS, FOURTH ANNUAL MEETING, INDIANA GAS ASSOCIATION.

Held in the Claypool Hotel, Indianapolis, Ind., January 17 and 18, 1912.

First Day—Morning Session.

The Response to the Welcome of the Governor was made by Mr. O. O. Thwing, as follows:

Gentlemen, I was being congratulated by Mr. Graf on the fact that it would be unnecessary for me to rise to the occasion. I find that my friend, the President, with his usual reversal of the laws of nature, has insisted upon my saying something. I was informed when I came into the hall that I was selected to reply to an address by Governor Marshall. I sat up talking with the President until 2:30 this morning, therefore, you will know the reason for the condition of my voice. Perhaps I was selected because the names of the members of the Association were all placed in a hat and one was drawn out. If it had been a prize, mine would have been the last name. Being a duty, of course, mine was selected. I had a few things that I would have liked the Governor to hear before he left to find out what the latest returns are in regard to the coming presidential nomination. I would have been pleased to have told him of our particular pleasure in listening to him address us at the present time, due to the fact that we might possibly say in later years that a President of the United States had addressed an Indiana gas convention. Previous to entering the gas business, strange as it may seem, I was quite well ac-

quainted with the Bible and Biblical lore, and while the Governor was speaking the parable of the two servants occurred to me. Possibly too few of us are acquainted with this line of history, and it will be necessary for me to explain. The Bible says a man left his home and entrusted to each of his two servants 10 talents. One servant invested the 10 talents in business, and upon his master's return, turned over 100 talents, for which he was properly commended and praised. The second servant buried his 10 talents in the ground, and when the master returned he had but the 10 talents remaining. And it struck me that that parable to a certain extent was typical of the gas business. The other big businesses take their 10 talents, invest them, doubling, trebling, quadrupling them, and finally are able to return them 10-fold to their master. The gas man buries his 10 talents in the ground, where most of his investment is, away from the watchful eyes of the public, of the papers, of the municipalities, of the States, and he is able only at the present day to return just about the 10 talents he buried in the ground. The Governor spoke, in the course of his address, as to the responsibilities of the gas companies to make some account or return for that which was given them. Such is the one thing to which I object. A gas company is very seldom given anything but trouble and criticism. The modern practice is for towns to offer bonuses, free land, free buildings, free anything, money in large amounts for factories and manufactories of all kinds to locate in their towns, but if a gas man comes along and wants to build a gas plant which will supply what has become absolutely a necessity of life to-day, does he receive anything, is he given anything? On the contrary, he is called upon to pay for a franchise and to have municipal or legislative or commission observation and overlooking of his business, of his profits, with the possibility—not probability—the possibility of it some time having competition or even losing out entirely. So that I always feel a little bit riled when anybody says that the gas companies of the country are given things. I believe they have been given nothing but tronble. On my way to St. Louis a short time ago some gentlemen from a big shoe house of that city were on the same train. In talking together they told about their method of doing business. They will not go into a town to establish a factory unless the ground and the factory were prepared for them. Then they guarantee a certain amount of wages per annum and 10 per cent. of the wages or salaries that they pay is applied, as reported by them, to wiping off the cost of the buildings and ground, and in the course of 10 years they own the buildings and ground and have paid for them both. At the same time they are not subjected to pub lic commissions or public inspection. Another thing the Governor said was that he hoped that the gas man would be a good citizen. There is absolutely no reason why the gas man should not be the best citizen of his community, but every reason why he should be, for no one else comes in contact with the public more than he does. There is nobody else more alive to the essential needs of the community, of the municipality. There is nobody else striving harder for a higher standard of municipal intelligence than the gas man, from the very nature of his business, from the fact that he has to do business with the entire municipality, and if he is not a good citizen the gas man in any community disappears in a very short time. [Applause.]

The thread of general business was hereupon resumed and the

Secretary-Treasurer's Reports

were read. As Secretary, Mr. Eves reported that the membership to Jan. 17, 1912, was 136 (active 88; associate, 48) as against a total of 109, same period, 1911.

As Treasurer, he reported a total receipt (including balance from last year) of $979.33, an expenditure of $841.63, and a cash balance of $130.70. The unpaid or arrears of dues account stood debited with $135.

On motion, the reports were accepted for filing. The President announced the appointment of the following special committees:

On Nominations.—Messrs. Messrs. W. Wallace (chairman), J. H. Maxon, H. S. Riley and J. H. Dykeman.

On Next place of Meeting.—Messrs. A. C. Blinn (chairman), J. P. Bippen and G. M. Dolley.

The Committees were instructed to report at the morning session of the following day.

Vice-President Olds took the chair, and President Mulholland read the following

INAUGURAL ADDRESS.

Mr. Chairman and Members of the Indiana Gas Association: At the present time the newspapers of the country are full of articles on big corporations. Big business has become a catchword in all sorts of discussions and at all sorts of public meetings. The government has instituted proceedings against certain corporations, claiming restraint of trade. The "Century Dictionary" defines the word "restraint" as being "The state of being repressed, curbed, or held back in any way."

The merits of the general proposition are not before this organization, and the necessity of taking sides in the discussions above mentioned is not with us to-day; but "Big Business" with restraint of trade is an ever active factor with all gas companies, for the gas business is a big business. While it is confined to the limits of municipalities, and is not competing with other gas companies, still it is big business to the people in the municipality it serves, and if it is not doing everything in its power to push its own business, and by so doing advance the interest of the community in which it operates, it most assuredly and positively is acting in restraint of its own trade.

Honest, big business is to-day employing the best legal talent that can be secured to advise in what, if any, particulars its methods of doing business are in conflict with the Sherman law and in restraint of trade, that it may so conduct its affairs in the future as to meet with the approval of the people.

In the gas business all may feel that its very nature, confined as it is within the limits of cities, and not competing with other gas companies, makes them immune from any such charge; nevertheless, most gas companies to-day are managing their businesses just as surely in restraint of their own trade.

A great mercantile institution of this country, said to be the greatest of its kind in the world, from time-to-time publishes in the newspapers a series of business editorials, being in fact its creed; and in setting same forth, as the service and spirit of a great store, uses the following quotation from Woodrow Wilson as a preface: "Profits are legitimate only when they come from service," and a retail business is described as an organization that deals with things in the particular and the little.

This is more especially true of a gas company than any other line of business, for the reason that we retail a commodity that supplies the homes of a city with an article that has become a necessity, comfort and convenience of the home.

The two fundamental facts that must always be borne in mind are: First, the quality must be as represented and the quantity adequate for the customer's needs. Nothing is too trifling to be studied, and since this policy has been found so wonderfully successful with a mercantile concern, would it not be of greater advantage for quasi-public corporations to steer their businesses along the same course? Are we not conducting our business in restraint of our own trade, hindering and limiting and restraining the securing of the full and entire amount of the business of the nature of our commodity—economical, convenient and a luxury within the reach of all, that it is—by failing to awaken to the possibilities within our reach? Gas, the manufacture of which requires large works, expensive and intricate apparatus, many competent employees, together with coal, coke, oil, etc., the cost of which is daily becoming greater, as well as the many miles of expensive pipe lines and appliances to convey under the streets to its customers, is in itself not an article of any value to the citizens of a community. It is unlike most other commodities that are in and by the very nature of themselves serviceable. To secure the full benefit of the economy and comfort of gas it must be used in appliances designed for its proper use, and unless these appliances are so designed or adjusted as to permit of proper use, gas is a failure or at least a near failure.

Are we not operating our business in restraint of our own trade by thinking gas appliances will keep themselves in proper working order and condition, which no other appliance has ever yet done? Are we not operating our business in restraint of our own trade by failure to see that the company has only such employees in office, works, shops, fitting, maintenance and street departments as are always striving to furnish the best attention, best quality of product, most efficient work and service, and best and most courteous treatment and earnest consideration to-and-of the necessities of our patrons, anticipating their requirements whenever and wherever possible? In a word, are we not conducting our business in restraint of our own trade by failing to bend, not only our personal energy, but by not insisting upon all employees doing the same, to the end that we may be looked upon as an institution that furnishes not only gas, but service also, thereby securing the reputation of being a business in which profits are legitimate because we give full value in the gas and the service furnished? However, unless such a policy is sincerely adopted

by the company itself and intensely reflected through its executive officers, employees cannot be expected to voluntarily work along these lines.

"We must do a thing, do it over again and keep on doing it until that thing has so impressed itself upon the minds of our patrons that they are forced to accept it," should be our policy, to the end that the public may, in the not far future, arrive at the realization of the fact, well known to ourselves, that the commodity and service we are supplying are furnished at as reasonable a price as the quality and selling value will permit, and that the margin of profit on gas is less than any other article equally as good, and on as just a basis as are the goods sold by other reputable manufacturers and merchants who do not have the hazards of accidents and other losses that are entailed in the manufacture and distribution of gas.

A good many utility companies have, during the past few years, rested content and satisfied in the thought that their policy was not that of the famous financier who is credited with the remark that "The public be d—d." The self-satisfied feeling that we are not taking this attitude toward the public has by many been thought to be sufficient. It is not enough. There is more to do. "Let well enough alone is a foe to progress. Do it better is a friend of the future."

To furnish service does not mean taking the dividends on their investment that stockholders are rightfully entitled to, but, on the contrary, it will entail little, if any, additional expense in having a more zealous and painstaking effort by every employee insisted upon, to the end that those who support the company by their patronage, and thereby cause the property to have any value whatever as an earning concern over a junk proposition, such as it would necessarily become, receive the full amount of value they are entitled to for each dollar spent by them in exchange for the commodity being furnished them; but even in the event a slightly increased expenditure should be necessary to substitute an employee of the above named type for one who cannot be brought to a realization of the imperative necessity of such service, or an additional employee added to insure greater promptness in attending to the demands of customers, such expense will be returned to the owners of the property many times over in many ways—the asset value of an enthusiastic customer cannot be measured; his value cannot be overestimated.

The purchaser of the product of a gas or electric company is not so much concerned about the rate per 1,000 cubic feet or kilowatt, the very meaning of which quantity terms to the majority are not at all clear as are the yard, bushel or pound measure by which other merchants' goods are sold, as what they receive for their dollar. A $2 gas bill for a month's poor light, or smoking, sooty gas range and insufficient gas pressure, resulting in failure to have properly cooked meals on time, abundance of hot water when wanted, and other annoyances, causes a complaint and enmity toward the company asking for payment for such service that is recalled whenever political agitation arises regarding rates; and the customer who would have been a friend if he had had the full economy, convenience and luxury of appliances in proper condition and right service in general, without these will naturally be found a foe.

Frequent and regular meetings of all employees having to do with distribution, by forming clubs, are very powerful helps toward educating employees as to what is owed the public. Comparatively recently the National Commercial Gas Association conceived the idea of forming what is termed local or company sections, composed of the men who are anxious to improve their usefulness. Officers are selected from their own numbers, and monthly and semi-monthly, the manufacturing, distribution, office and new business employees hold in the company's office what in reality is a small gas convention; a paper on some such subject as water heaters, arc lamp maintenance, proper meter setting or other subjects of interest, is read and discussed, a question box adds to the interest and educational value of tne meetings, and a better understanding is arrived at by employees why team work between the departments is so essential to the proper operation of the business.

While the very existence of public utility companies depends upon retaining present consumers, a word in reference to new business, for which all are actively striving, is apropos. It is an axiom of the gas business that gas ranges giving economical and satisfactory service have sold more gas ranges and secured more new business than any other one thing. Therefore, would not new business departments directly, and the company eventually, be great gainers if the citizens of a community were not simply satisfied consumers, but enthusiastic ones, resulting in the company's being looked upon as one of the city's best institutions, and referred to with the same degree of pride as are its leading manufactories, prominent stores and other institutions that are regarded with great favor by the residents of a city? Gas companies can actually occupy this position in a community, notwithstanding the prejudice of long standing, by concentrating their efforts to sell good service, for then, and then only, will profits be recognized by the public as legitimate.

Among the happenings of the past year, of interest to gas men and gas associations, has been the organization of a new Ohio Gas Association. The organization took place last February, and the first annual meeting of the Association will be held in Columbus, O., February 6, 1912. As set forth in a recent communication, issued by the Executive Committee of the Ohio Association, the principal objects of the new Association are, in a few words, to promote the general welfare of the gas business and keep in touch with current events which in any manner affect or relate to the industry, and furnish information connected with the industry to any member who may desire the same; to give officials who make and execute legislation such assistance and information as may be possible and acceptable, to the end that their action and rulings may be fair to both the public and the utilities; to enable the companies to conduct their operations strictly within the law, and to provide a bureau for furnishing such information as may be valuable and unknown to them. A campaign of publicity is also provided for, in order that the public and the officials may have a correct understanding of the gas business.

It will be noted that the matter of papers on subjects more or less technical is regarded by the new Association as of minor importance, and it is the belief of your President that the Indiana Gas Association would do well to take such action as will bring this Association back to more nearly the original purpose for which it was organized in 1908; viz., in a general way, the accomplishing of those things that the new Ohio Association has decided are most essential. It is not proposed by this that there should be no papers read at the annual meetings; rather that the number of papers be perha ps more limited, and, in a general way, of more live interest to the m ajority of those who come to the Association meetings than are the technical papers we have been endeavoring to have, that our programme may show a certain respectability in comparison with programmes of other and larger Associations.

A bureau of information could be established by the Indiana Association, that could be operated without cost, by appointing a committee, to the chairman of which any member of the Association could write at any time, asking for information concerning any trouble in operation or other thing that might arise during the year about which he might desire advice the committee comprising such bureau of information to be composed of members of the Association who have specialized on subjects pertaining to the different dep artments of the the gas business. For instances, one member of such committee could be some one familiar with the construction of apparatus, one who has had extended experience in works' operation problems, one who understands the best practice of distribution methods, one who has been successful in new business, one who has studied the details of the office and accounting department, and another who is familiar with the chemistry of the business. Such correspondence, including inquiries and replies, to be made part of the Association programme at the annual meetings, and discussed by the members, after receiving the reports of the members asking for the information as to how they overcame the difficulties concerning which they asked for advice. This would not only take the place of technical papers, but be, as well, intensely practical.

It is believed by many that the greatest benefit to be secured by gas companies and gas men of the State of Indiana would be by conducting our efforts something along the above line, and while some papers should unquestionably be presented, it is believed that all will admit that that part of the meeting that does the most good is the rubbing of elbows with our contemporaries, whom we would not meet except on such occasions, and listening to their recital of imaginary and other troubles, and how they surmounted their difficulties and thus achieved satisfactory results.

I would suggest that this Association extend congratulations to the new infant who has come to reside in our adjoining State of Ohio, and also in the event a committee should take up the matters hereinbefore referred to, that they consider the advisability of having the two Associations co-operate, with the view of enabling each to know of those things relating to pertinent matters that may be arising in the adjoining State, which, by the very reason of the close proximity of the two commonwealths, are almost certain to be of interest and importance to the other.

The Vice-President said it was certainly very pleasing to have such a splendid address. It gave him a great deal of pleasure to appoint as a

COMMITTEE ON PRESIDENT'S ADDRESS,

Carl H. Graf, O. O. Thwing, S. T. Murdock.

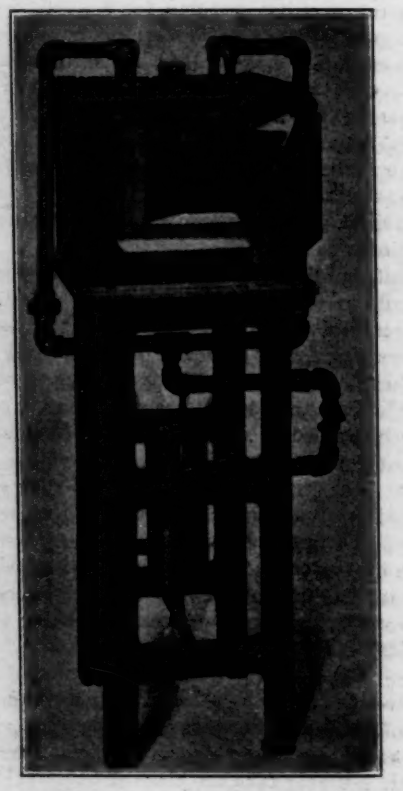
The President said before taking up the first paper on the programme he wished to state that, as the first President of this Association, one who had always been very active in its interests, was unable to be present, had sent a letter expressing sorrow at being kept at home by reason of illness, so he believed it would be appropriate to send a telegram expressing the feeling of this Association towards Mr. James W. Dunbar. If there were no objection the Secretary was instructed to send a telegram from the Association expressive of its fellowship for Mr. Dunbar. The Secretary reported subsequently that the following telegram had been sent:

Indiana Gas Association, enjoying its fourth annual meeting, sincerely regrets your unavoidable absence through illness and, extends heartiest sympathy, hopes for your speedy recovery.

(To be Continued.)

Management & Commercial Methods.

THE SIMPLEX GAS FORGE.—For forging and hardening lathe, planer and boring tools, made from carbon and high speed steels, the Simplex Tool and Supply Company has recently brought out a new type of gas forge. Among the advantages claimed for it are ability to watch the tool constantly, a clean output, fusing of the tool nose is eliminated, time is saved in performing the forging and hardening operations and an increased tool efficiency is secured.



A new type of gas forge for forging and hardening, built by the Simplex Tool and Supply Company, Boston, Mass.

Hitherto gas furnaces have been employed for hardening milling cutters, drills, reamers, etc., but a different type of furnace had to be used for lathe and special tools. Soft coal has formerly been employed as fuel in the furnaces, and at a temperature of 2,250° F. the pores of the steel are opened, with the result that sulphur and impurities from the fire are absorbed, and in service the tool shows a decrease in efficiency which in some cases is said to be as high as 50 per cent. In addition to being used in a tool hardening room these forges can also be installed in railroad repair shops, since their capacity is sufficient to enable them to take the largest sizes of tire turning tools.

The following table gives the principal dimensions and specifications of the forge:

Inside height, inches	8
Inside width, inches	10
Inside depth, inches	16
Width of entrance, inches	8
Height of entrance, inches	6
Height of entrance from floor, inches	40
Number of burners	4
Gas consumed per hour, cubic feet	100
Air pressure required, pounds	1½
Floor space, inches	36x30
Weight, pounds	500

Items of Interest
FROM VARIOUS LOCALITIES.

MR. A. M. SUTHERLAND has been awarded the contract for the construction of the gas plant to be operated on municipal account by the authorities of Albany, Ga. The plans call for duplicate apparatus, even to the holders, up to an output of 160,000 cubic feet every 24 hours. The Sutherland type of apparatus is to be used, and the contract calls for the completion of the system in 6 months. The agreement provides for the placing of 10 miles of distributing mains.

THE Gas Machinery Company, of Cleveland, O., has been awarded contracts for silica retorts and settings to be installed in respective gas plants of Coldwater, Mich., and Millville, N. J.

THE Brockton (Mass.) Company proposes to extend its mains to and through the outlying settlement of East Bridgewater.

MR. HOWARD SCARFF has been appointed Cashier of the Enid (Okla.) Electric and Gas Company, vice Mr. L. J. Walters, resigned.

MR. EMERSON L. FRANKLIN, formerly Secretary of the Easton (Pa.) Gas and Electric Company, has been appointed General Superintendent of the Eastern Pennsylvania Power Company, with headquarters in Easton, Pa.

AT the annual meeting of the Easton (Pa.) Gas and Electric Company, a resolution was enacted, under the operation of which the Company's capitalization will be reduced to $2,000. It was $2,000,000.

WE regret to have to chronicle the death of Mr. James M. Nelson, who died at his home in Elmhurst, Long Island, the night of February 1st. He was in his 71st year, having been born March 29th, 1841. He became attached to the working force of the New York Mutual Gas Light Company in 1876, and at the time of his death he was its Assistant Superintendent. His widow survives him; also, one son and two daughters.

"W. W. M.," writing under date of the 30th ult., incloses the following: "The first step in a plan for the consolidation of certain power to companies in Cumberland and York counties, Me., has been taken by Messrs. Maynard S. Bird & Co., of Portland, Me., who are offering to pay $75 per share in cash or $50 cash and the balance in shares of the new controlling corporation. The York Light and Heat Company is capitalized at $400,000, and $384,500 in stock is now outstanding, most of which is held by residents of Cumberland and York counties. The York corporation was organized in 1891, and it controls the Biddeford and Saco Light and Heat Company, the Saco and Biddeford Gas Company, and the Old Orchard Electric Light Company. Its gas output is 18 millions, and has perhaps 14 or 15 miles of mains. It also controls the electric interests of Biddeford, Kennebunkport, Wells and York Harbor; supplies power to the Biddeford and Saco Railroad and the Atlantic Shore Line, as well as to many general manufacturing plants. Its officers are: President, Geo. F. West; Vice-President, J. G. Shaw; Treasurer, E. C. Hersey.

THE official announcement by General Superintendent Barker, of the Denver (Col.) Gas and Electric Company, respecting the recent gas rate concession by that corporation contains the following paragraphs:

"We wish to announce to you that we have reduced the price of gas per 1,000 cubic feet, from 90 cents to 85 cents, net, when paid on or before discount day. The readiness-to-serve rate is reduced from 70 cents to 65 cents per 1,000, plus the same fixed charge, less than 10 per cent., when paid on or before the discount day. These reduction are effective from this date.

"We are very grateful for your patronage the past year, and hope that our efforts to keep up the highest standard of service will prove worthy of your personal goodwill. Our management is anxious to leave no stone unturned in making such improvements as will tend in any way to please our customers."

RECENT advice from Baltimore, Md., are to the effect that there are at present 500 persons resident abroad who are owners of either or

both the preferred and common stocks of the Baltimore Consolidated Gas, Electric Light and Power Company.

It is virtually determined that the United Electric Light and Power Company, of New York, which is controlled by the Consolidated Gas Company, of New York, will construct a power house in the city, the cost of which will, in so far as estimates now may determine, involve an expenditure of $8,000,000.

At the annual meeting of the shareholders in the Rathbone, Sard & Co., corporation, the officers elected were: President, Geo. E. Sard; Vice-Presidents, Edward Bowditch and Edmond Raftery; Treasurer and General Manager, Russell E. Sard; Secretary, Arthur M. Blanchard. Mr. George Sard, who has been General Manager of the corporation since its formation, stated to the Board of Trustees that he wished to be relieved of the general supervision of the business, but was willing to retain the Presidency and to serve in an advisory capacity. As Mr. Sard has been actively engaged in the business for over 50 years, his desire to be relieved of many of his responsibilities was respected by the Board, and Mr. Russell Sard, son of Mr. George Sard, was elected General Manager. The new incumbent is well equipped to carry on the responsibilities of the position of General Manager to the Company, having served apprenticeship in all the departmental branches of its tradings.

Mr. Chas. F. Cattell, of West Chester, Pa., Superintendent of the Parkesburg (Pa.) Gas Company, has ordered the South Chester (Pa.) Tube Company to forward sufficient material to pipe the streets of Parkesburg and the surrounding settlements that will be in the Gas Company's district. It will require about 10 miles of pipe to fill this order.

By-the-way, Mr. Cattell is also interested in the new gas plant that is to be constructed in Lehighton, Pa.

At the annual meeting of the shareholders in the Los Angeles (Cal.) Gas and Electric Company the officers chosen were: Directors, W. B. Cline, Wm. M. Van Dyke, Wm. Baurhyte, C. P. Houghton, Wm. A. Cheney, C. O. G. Miller and B. Schilling.

The payment to the city by the Evansville (Ind.) Gas and Electric Company (3 per cent. on the gross receipts) on royalty accounts amounted in 1911 to $2,089 06, as against a payment in 1910 on similar account of $2,198.66.

Mr. R. M. Redding, Manager of the Macon (Ga.) Gas Company, having completed the installation of a duplicate water gas apparatus, has placed a contract with the Gas Machinery Company, of Cleveland, O., for a 36-inch ammonia concentrator for the recovering of the free as well as the fixed ammonia from his coal gas liquor. Through Mr. Redding's intelligent direction the sendout of the Macon plant has been greatly increased, and he is now running his coal gas plant to full capacity, although large volumes of water gas are also being manufactured.

"J. A. B.," writing from San Francisco, Cal., under date of the 1st inst., incloses the following: "Yesterday the Supreme Court of California confirmed or upheld the action of the Sunset Telephone and Telegraph Company in declining to pay a portion of the damages occasioned to G. W. Dow, who was injured through contact with a broken electric current carrying wire that in its descent crossed a wire operated by the Oakland Gas and Electric Company. Concurrently the decision declares that under the constitution, an injured person may have but one satisfaction for the injuries experienced, even should several be liable. Dow was employed by the Telephone Company. When out on the line, one of the wires of his Company crossed a wire of the Gas Company, and Dow was burned in the shock that followed. He sued the Gas Company and obtained a damage award of $3,500. Defendant paid over the money, and in time sought reimbursement from the Telephone Company for its share. The latter refused to acknowledge the debt, and suit was brought to recover. The court ruled that, even though the Telephone Company was equally liable with the Gas Company for the sum awarded by the jury, the Gas Company's payment of the sum awarded, altogether relieved the Telephone Company of any or all obligation in the premises."

The last statement by Auditor H. J. Jumonville, of the New Orleans Railway and Light Company, respecting its income account (net) for December last, compared with the like return for 1911, states that the former exceeded the latter in the sum of $21,750.71. The net income for the year 1910 was $635,892.29; for 1911 it was $771,698.36, an increase for the last twelvemonth amounting to $135,804.07.

Manager J. A. Cleveland, of the Saginaw City (Mich.) Gas Company, after much deliberation over the matter, recently submitted the following rate schedule to his Company, which schedule was ratified, and put in force, as of the first prox.: First 15,000 cubic feet used per month, 90 cents per 1,000; second 15,000 cubic feet, 85 cents; next 20,000 cubic feet, 80 cents; next 23,000 cubic feet, 75 cents; next 25,000 cubic feet, 70 cents; next 50,000 cubic feet, 65 cents; next 50,000 cubic feet, 60 cents; on all used over 200,000 cubic feet, 55 cents per 1,000. Which taken as a whole, means very low sales' rates for a city like Saginaw City.

Messrs. J. C. Kittrell, of Henderson, N. C., and A. M. Worstall and W. M. Kummerle, of Philadelphia, Pa., have organized the Henderson Gas Company to "purchase, manufacture or acquire gas for illuminating or other purposes, with an authorized capital of $200,000, in Henderson."

The parties applying to the authorities for the right to construct and operate a gas plant in Wilson, N. C., agree to commence work within 4 months from issuance of franchise, and to have same completed within 18 months; the grant is to run for 20 years, at the end of which period arbitrators acting for the city may value the plant for account of taking same over for operation on municipal behoof. If this is not done within a 12-month, then the Company may continue for 20 years in control, when the city shall again have the right to exercise an option for purchase; and so on indefinitely for 20-year periods. Gas is to be furnished to certain city buildings free of charge; no charge may be made for use of meters; the illuminating value of the gas shall not be less than 20 candles, "or equal to that supplied to any other city of equal size in the State;" and the rates shall be: Maximum, $1.60 per 1,000 cubic feet, less 10 cents per 1,000 off for payment within 5 days; but when the annual output reaches 10 millions cubic feet there shall be a further reduction of 10 cents per 1,000 cubic feet.

"P. V. V.," writing from Minneapolis, Minn, under date of the 5th inst., forwards the following "The Engen ordinance, regulating the location and erection of gas manufacturing plants, which has been dragging along in the City Council for close to a year, was recommended by a joint committee for passage last week. It provides that no gas manufacturing plants shall be located within one-twelfth of a mile from any school property, nor without special permission from the City Council, and, finally, that it shall not be connected with any city sewer."

We are told that work on the proposed gas plant for Waxahachie, Tex., will be commenced forthwith, or just as soon as the spur from the main line of the Houston and Texas Central Railroad to the gas works' site has been completed.

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,015,296. Gas Producer. W. B. Chapman, New York City.

1,015,306. Gas Lighting Burner. E. N. and E. A. Frary, Deerfield, Mass.

1,015,353. Gas Purifier. H. A. Smith, Isabel, Ills.

1,015,549. Gas Generating Plant. H. Foersterling, Perth Amboy, N. J., assignor to Roessler and Hasslacher Chemical Company.

1,015,550. Method of and Apparatus for Generating Gas, Steam and Power. H. Foersterling, Perth Ambey, N. J., assignor to Roessler and Hasslacher Chemical Company.

1,015,562. Mantle Support for Gas Lamps. A. H. Humphrey, New York City.

1,015,563. Gas Lamp. F. J. and H. R. Humphrey, Kalamazoo, Mich, assignors to General Gas Light Company, same place.

1,015,564. Gas Lamp. F. J. and H. R. Humphrey, Kalamazoo, Mich., assignors to General Gas Light Company, same place.

1,015,597. Gas Stove. J. Stubbers, Covington, Ky,, assignor to the Incandescent Light and Stove Company, Cincinnati, O.

1,015,632. Gas Generator. S. N. North, Rising Sun, Ind.

1,015,692. Inverted Burner. S. Krauze, Warsaw, Russia.

The Market for Gas Securities

The value changes in city gas shares, as reflected by the final quotations for the week, show that business was small in volume and transfers were made in changes quite fractional. Consolidated opened to-day (Friday) at 139½ to 140; Brooklyn Union, 138 to 139½.

The out-of-town shares show virtually no changes, although an exception is shown in Washington, D. C., which is reported at 420 to 425. The annual meeting of this Company was notable for the retiring from the Board of Mr. Jno. McIlhenny, whose yeoman's service in many ways to the Company could never be repaid in a way financial. His successor is his clever son, Mr. Jno. D. McIlhenny, whose practical knowledge of gas management, from works to the cashier's desk, is of the best order; and Mr. Goldborough's place is taken by Mr. R. H. Fraser. The Board organized by electing Mr. Joseph Leiter to the Presidency. He may be able to successfully lead the Company, and after the safe manner in which it was led by the McLean regime; but if one is to try to judge of the future by the evidence of the past, the new President's work has been of the meteoric or rocket order, rather than that of Mr. McLean and his fellows, who were satisfied to hasten slowly.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

FEBRUARY 12.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	139¾	139½
Central Union Gas Co. — 1st 5's, due 1972, J. & J.	8,000,000	1,000	103	105
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	3,500,000	100	165	175
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	101	102½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98¼	100½
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	100	102
Standard	5,000,000	100	60	70
Preferred	5,000,000	100	90	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	138	139½
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	½	¾
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	509,000	1,000	97	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	87	90
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—		—
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,661,000	—		—
Con. Gas Co., Baltimore City, 4½	2,751,000	—		—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	975,000	1,000	94	96
Bonds	75,000	—	—	100
Detroit City Gas Co.	6,580,000	—	—	50
Detroit Gas Co., 5's	381,000	1,000	75	80
" Prior Lien 5's	5,619,000	1,000	97	100½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	123	126
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	130	132
" Bonds, 5's	10,500,000	—	104	106
Indianapolis	2,000,000	—	—	38
" Bonds, 5's	2,650,000	—	104¼	105
Jackson Gas Co.	250,000	50	89	—
" 1st Mtg. 5's	290,000	1,000	91	95
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	96
Bonds, 1st 5's	3,822,000	1,000	99	102
Laclede Gas Co., St. Louis.	10,000,000	100	107¼	107½
Preferred	2,500,006	100	114	120
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co. " 1st Mtg. 6's	400,000	1,000	108	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	91¼	91½
Preferred	25,000,000	100	97	98
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106¼	106½
1st Mortgage	20,100,000	1,000	102	102½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105¼
Pacific Gas and Electric Co.	15,500,000	—	54½	55
St. Joseph Gas Co.— 1st Mtg. 5's	1,000,000	1,000	96	98
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	420	425
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 16 to 18, 1912. Atlantic City, N. J. Officers: President, Ira C. Copley, Aurora, Ills. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, ——— Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keilior, Hamilton, Ont.

Empire State Gas and Electric Association.— nnual meeting, New York City, Oct. 1912. Officers: President, R. M. Searle, Rochester, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1913. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March 20 and 21, 1912, Auditorium Hotel, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E. Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Sept. ———1912, ——— Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, Albert J. Marshall, 16 East 40th street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, A. L. Eustice, 105 North Wabash avenue.

Indiana Gas Association.—Annual meeting, March, 1913, Indianapolis. Officers: President, Howard L. Olds, Indianapolis; Vice-President, Wm. Wallace, Lafayette; Secretary-Treasurer, Phumer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, 22, 23 and 24, 1912; Lincoln, Neb. Officers: President, G. W. Clabaugh, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, Sept. 1912. Manhattan, Kas. Officers: President, B. F. [illegible]yer, Manhattan, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. ———1912;——— Officers: President, F. W. Blowers, Kalamazoo, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1912 Atlanta, Ga. Officers: President, C. L. Holman, St. Louis, Mo.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May, 1912, Kansas City, Mo.; Officers: President, A. B. Macbeth, Independence, Kas. Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 14th and 15th, 1912 Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn, Belmar, N. J.

Ohio Gas Association.—Annual meeting, February 6 and 7, 1912, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary-Treasurer, T. C. Jones, Delaware, O.

Oklahoma Gas, Electric and Railway Association.—President, Noel R. Gascho, Alva Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. ———1912, ——— ——Officers: President, W. Baurhyte Los Angeles, Cal.; Vice President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting. Williamsport, Pa., April 8-10, 1912. Officers, President, C. W. Butterworth, Philadelphia, Pa.; Secretary-Treasurer, William H. Merritt Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, Dec., 13, 1912; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 39th street, New York city.

Southern Gas Association.—Annual meeting, April 17-19, 1912, Jacksonville, Fla. Officers: President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April 25, 26, 27, 1912 San Antonio, Tex. Officers: President, J. E. Carroll, Beaumont, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis. Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.